De Beers Canada

April 2012

GAHCHO KUÉ PROJECT ENVIRONMENTAL IMPACT STATEMENT
INFORMATION REQUEST RESPONSES

APPENDICES FOR RESPONSES TO NATURAL RESOURCES CANADA (NRCAN) INFORMATION REQUESTS

Appendix NRCan 1-9-A

Borehole Logs, Gradation Analysis (Till Samples), Testing Results of Soft Lake Bottom sediments and a Summary of Subsurface Condition from 2004 Site Investigation

Appendix NRCan 1-12-A

2012 EBA Technical Memo – 2012 Gahcho Kué EIS Supplement - Summary of Dyke Conceptual Design and Construction Material for Gahcho Kué Diamond Project, NWT, Canada – March 27, 2012

Appendix NRCan 1-12-B

Details of Existing Geotechnical Investigations (Table 1 – Updated EIS Case), Borehole Logs (2004 Site Investigation), Grain Size Analysis Test Results on Borrow Material, Grain Size Analysis Test Results on Till Samples, Soft Lake Bottom Sediments Testing

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Appendix NRCan 1-9-A

Borehole Logs, Gradation Analysis (Till Samples), Testing Results of Soft Lake Bottom sediments and a Summary of Subsurface Condition from 2004 Site Investigation

SRK Consulting
Engineers and Scientists

FIELD DRILL PERFORMANCE LOG

PROJECT:	**Gahcho Kue Geotech**
PROJECT NO:	**2CD002.11**
NORTHING:	7036644.3
EASTING:	589928.4
SURFACE ELEVATION:	404.7
AZIMUTH:	0
DIP:	90

HOLE NO:	**MPV_04_123C**
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	2/02/2004 1700hrs
DATE AND TIME FINISHED:	05/02/2004 0700
HOLE DIAMETER:	101.6 (HQ3) & 47.6 mm (NQ)
DRILLING METHOD:	Geobore and diamond core

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
DS 0700-1900	R Bowden	02/02/2004	1830	2	0	2.85		2.85	2	1.43	2	0	2	1.43
NS 1900-0700	J Siddorn	02/02/2004	0630	12	0	6.10		3.25	12	0.27	14	0	14	0.44
DS 0700-1900	R Bowden	03/02/2004	1830	12	11.5	6.10	Changed bit had to ream hole	0	0.5	0.00	26	11.5	14.5	0.42
NS 1900-0700	J Siddorn	03/02/2004	0630	12	2.5	8.40	Sanded rods	2.3	9.5	0.24	38	14	24	0.35
DS 0700-1900	R Bowden	04/02/2004	1830	12	11	11.40		3	1	3.00	50	25	25	0.46
NS 1900-0700	J Siddorn	04/02/2004	0630	12	5	20.54	Tried to packer test, failed gauge, setup	9.14	7	1.31	62	30	32	0.64
DS 0700-1900	R Bowden	05/02/2004	1830	12	10	26.74	END OF HOLE, reflex and packer testing	6.2	2	3.10	74	40	34	0.79
NS 1900-0700	J Siddorn	05/02/2004	0630	12	12	26.74	Packer testing	0	0	#DIV/0!	86	52	34	0.79

OVERALL HOLE DRILL RATE (m/hr)	0.31
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	0.79

GEOTECH LOGGING 1 - INPUT (GENERAL GEOTECH LOG)

DRILLHOLE ID: **MPV_04_123C**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
0.00	1.10	1.10	ICE							ICE
1.10	2.85	1.75	Water							Water
2.85	5.00	2.15	TILL							Geobore S Tube 1 Granite boulder in sediment, poor sed recovery
5.00	5.80	0.80	TILL							Geobore S Tube 2 Granite, sand and gravel
5.80	6.10	0.30	GR							Geobore S Tube 3 Granite
		0.00								Geobore S Tube 4 Redrill/cave material post bit change during reaming ho
6.10	6.89	0.79	GR							Geobore S Tube 5 Granite no sediment
6.89	7.65	0.76	GR							Geobore S Tube 6 Granite
7.65	8.10	0.45	GR							Geobore S Tube 7 Granite
8.10	8.40	0.30	GR							Geobore S Tube 8 Granite
8.40	12.78	4.38	GR	4.38	100.0	4.22	96.3	3.15	71.9	Box 1 of NQ drilling
12.78	17.12	4.34	GR	4.27	98.4	3.48	80.2	3.37	77.6	Box 2
17.12	21.42	4.30	GR	4.30	100.0	4.14	96.3	3.45	80.2	Box 3
21.42	25.50	4.08	GR	4.08	100.0	3.98	97.5	2.94	72.1	Box 4
25.50	26.64	1.14	GR	1.12	98.2	1.12	98.2	1.05	92.1	Box 5
		0.00								
		0.00								
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GEOTECHNICAL LOGGING 2 - INPUT (DETAILED LOG)

DRILLHOLE ID: **MPV_04_123C**

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

FROM	TO	ROCK	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of			JOINT CONDITIONS				COMMENT
(m)	(m)	TYPE	% STRONG	% WEAK	OVERALL	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH	Sets	Type	Totals	ANGLE	ROUGH	ALT	FILL	
8.40	12.78	GR	100	0	100	30	0	21	0	0	0	0	3	J1	9	65	4	0	9	
			R5		R5									J2	8	65	4	0	9	
														J3	1	37	5	0	9	
12.78	17.12	GR	100	0	100	27	0	11	0	0	1	0	3+1	J1	2	38	4	0	9	
			R5		R5									J2	5	37	4	0	9	
														J3	1	22	1	0	9	
17.12	21.42	GR	100	0	100	30	0	27	0	0	1	0	2+1	J1	3	40	6	1	3	
			R5		R5									J2	5	28	1	0	9	
														J3	19		1	0	9	angles measured on uphole face
21.42	25.50	GR	100	0	100	30	0	30	0	0	0	0	2+1	J1	9	81	4	1	3	
			R5		R5									J2	1	32	4	1	3	
														J3	23		1	0	9	
25.50	26.64	GR	100	0	100	4	0	4	0	0	0	0	1+1	J1	2	85	5	1	1	
			R5		R5									J2	2		4	0	9	
																				END OF HOLE
					100															
					100															
					100															
					100															

SRK Photo Log Sheet

Drillhole ID: **MPV_04_123C**

Shift	Camera Photo Number	Filename	Depth	Description
NS 1900-0700	82	MPV-04-123c_8.4m_DRY	8.4-12.78	Box 1 NQ core
NS 1900-0700	83	MPV-04-123c_12.78m_DRY	12.78-17.12	Box 2 NQ core
DS 0700-1900	84	MPV-04-123c_17.12m_DRY	17.12-21.42	Box 3 NQ core
DS 0700-1900		MPV-04-123C-21.42-DRY	21.42 - 25.20	Box 4 NQ core
DS 0700-1900		MPV-04-123C-25.50-DRY	25.50 - 26.74	Box 5 NQ core

Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV_04_123c	1	8.40	12.78
MPV_04_123c	2	12.78	17.12
MPV_04_123c	3	17.12	21.42
MPV_04_123c	4	21.42	25.50
MPV_04_123c	5	25.50	26.64
	6		
	7		
	8		
	9		
	10		
	11		
	12		
	13		
	14		
	15		
	16		
	17		
	18		
	19		
	20		

FIELD GEOLOGICAL LOG

HOLE ID MPV_04_123c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	2.85	Ice/water	n/a	1.1m ice, to 2.85m water	RB/JS
2.85	6.1	Overburden	n/a	Overburden	RB/JS
6.10	26.64	Granite	n/a	Granite	RB/JS
EOH					

POINT LOAD TEST - INPUT

DRILL HOLE ID: MPV-04-123C

No. #	Tested by	DATE	HOLE/ FACE ID	DIST. (m)	ROCK TYPE	TEST TYPE	ORINT	DAYS	W (mm)	D (mm)	P (kN)	COMMENT
1	J Delgaty	##############	MPV-04-123C	25.94	Granite	1				47.70	17.16	Medium to coarse, white/grey granite - a nice clean break
2	J Delgaty	##############	MPV-04-123C	to	Granite	1				47.70	13.65	Medium to coarse, white/grey granite - a nice clean break
3	J Delgaty	##############	MPV-04-123C	26.13	Granite	1				47.70	13.12	Medium to coarse, white/grey granite - a nice clean break
1	J Delgaty	##############	MPV-04-123C	26.34	Granite	1				47.70	14.59	Medium to coarse, white/grey granite - a nice clean break
2	J Delgaty	##############	MPV-04-123C	to	Granite	1				47.70	11.33	Medium to coarse, white/grey granite - a nice clean break
3	J Delgaty	##############	MPV-04-123C	26.48	Granite	1				47.70	10.08	Medium to coarse, white/grey granite - a nice clean break

UCS SAMPLES

HOLE ID: MPV-04-123C

HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-123C	5	26.13	Granite	04-UCS-123-001

Geobore S Tube Tracking Sheet

Drillhole ID	Geobore S tube	From	To
MPV_04_123c	1	2.85	5.00
MPV_04_123c	2	5.00	5.80
MPV_04_123c	3	5.80	6.10
MPV_04_123c	4	N/A	N/A
MPV_04_123c	5	6.10	6.89
MPV_04_123c	6	6.89	7.65
MPV_04_123c	7	7.65	8.10
MPV_04_123c	8	8.10	8.40

SRK Consulting Packer Test Field Data

Project Name:	**Gahcho Kue Geotech**		**Drillhole No:**			**MPV_04_123C**	
Project No:	**2CD002.11**		Test Numbers			1 to 6	
Date:	05-Feb-04		Drillhole depth:			26.64	
Personnel:	R. Bowden/J.P. Siddorn		Inclination from horizontal			89	
Init. WL:	0		Test Interval:	From		To	
Ref. Pt.	drill shack floor						

Test 1 **25.1** **26.64**

Step No.	Elapsed time (min)	Meter reading (gal)	Flow rate (gpm)	Gauge pressure (psi)	Comments
1	0	72.00		10.0	no leaks
	1	76.50	4.50	10.0	THIS DATA HAS BEEN CORRECTED
	2	80.80	4.30	10.0	
	3	85.30	4.50	10.0	
	4	89.50	4.20	9.5	
	5	94.00	4.50	10.0	
2	0	110.00		17.5	
	1	116.80	6.80	17.5	
	2	123.50	6.70	17.0	
	3	130.00	6.50	17.0	
	4	136.60	6.60	17.0	
	5	143.40	6.80	17.0	
3	0	210.00		25.0	
	1	218.50	8.50	25.0	
	2	226.80	8.30	25.0	
	3	235.20	8.40	24.0	
	4	243.60	8.40	24.5	
	5	251.80	8.20	24.5	
4	0	266.00		17.0	
	1	273.00	7.00	17.0	
	2	279.80	6.80	17.5	
	3	286.80	7.00	17.5	
	4	293.80	7.00	18.0	
	5	300.80	7.00	17.5	
5	0	308.00			
	1	313.10	5.10	9.0	
	2	317.90	4.80	9.0	
	3	323.20	5.30	9.0	
	4	327.80	4.60	9.0	
	5	332.80	5.00	9.0	
	6	337.60	4.80	9.0	
	7	342.50	4.90	9.0	

Test 2 **22.1** **25.1**

Step No.	Elapsed time (min)	Meter reading (gal)	Flow rate (gpm)	Gauge pressure (psi)	Comments
1	0	531.50		15.0	no leaks
	1	537.80	6.30	15.0	
	2	543.30	5.50	15.0	
	3	545.00	1.70	15.0	
	4	546.00	1.00	15.0	
	5	547.00	1.00	15.0	
2	0	548.40		20.0	
	1	549.60	1.20	20.0	
	2	550.80	1.20	20.0	
	3	552.20	1.40	20.0	
	4	553.60	1.40	20.0	
	5	554.90	1.30	20.0	
3	0	557.70		25.0	
	1	559.10	1.40	25.0	
	2	560.60	1.50	25.0	
	3	562.10	1.50	25.0	
	4	563.70	1.60	25.0	
	5	565.20	1.50	25.0	
4	0	565.80		20.0	
	1	567.10	1.30	20.0	
	2	568.50	1.40	20.0	
	3	569.60	1.10	20.0	
	4	570.90	1.30	20.0	
	5	572.10	1.20	20.0	
5	0	573.30		15.0	
	1	574.20	0.90	15.0	
	2	575.10	0.90	15.0	
	3	576.10	1.00	15.0	
	4	577.10	1.00	15.0	
	5	578.00	0.90	15.0	

Test 3 **19.1** **22.1**

Step No.	Elapsed time (min)	Meter reading (gal)	Flow rate (gpm)	Gauge pressure (psi)	Comments
1	0	644.00		10.0	no leaks
	1	649.10	5.10	10.0	
	2	654.70	5.60	10.0	
	3	660.00	5.30	10.0	
	4	664.90	4.90	10.0	
	5	668.70	3.80	10.0	
	6	672.10	3.40	10.0	
	7	674.90	2.80	10.0	
2	0	680.00		15.0	
	1	683.40	3.40	15.0	
	2	686.50	3.10	15.0	
	3	689.50	3.00	15.0	
	4	692.40	2.90	15.0	
	5	695.50	3.10	15.0	
3	0	700.00		20.0	
	1	704.40	4.40	20.0	
	2	708.20	3.80	20.0	
	3	711.80	3.60	20.0	
	4	715.60	3.80	20.0	
	5	719.40	3.80	20.0	
4	0	722.70		15.0	
	1	725.30	2.60	15.0	
	2	727.60	2.30	15.0	
	3	729.30	1.70	15.0	
	4	730.90	1.60	15.0	
	5	732.70	1.80	15.0	
5	0	733.80		10.0	
	1	734.40	0.60	10.0	
	2	734.90	0.50	10.0	
	3	735.30	0.40	10.0	
	4	735.60	0.30	10.0	
	5	736.10	0.50	10.0	

Test 4 **16.1** **19.1**

Step No.	Elapsed time (min)	Meter reading (gal)	Flow rate (gpm)	Gauge pressure (psi)	Comments
1	0	894.00		5.0	no leaks
	1	897.10	3.10	5.0	
	2	899.10	2.00	5.0	
	3	900.20	1.10	5.0	
	4	900.90	0.70	5.0	
	5	901.70	0.80	5.0	
	6	902.40	0.70	5.0	
	7	903.40	1.00	5.0	
2	0	905.60		10.0	
	1	907.00	1.40	10.0	
	2	908.60	1.60	10.0	
	3	909.90	1.30	10.0	
	4	911.40	1.50	10.0	
	5	912.90	1.50	10.0	
3	0	915.40		15.0	
	1	917.20	1.80	15.0	
	2	919.00	1.80	15.0	
	3	920.80	1.80	15.0	
	4	922.80	2.00	15.0	
	5	924.70	1.90	15.0	
4	0	926.00		10.0	
	1	927.30	1.30	10.0	
	2	928.50	1.20	10.0	
	3	929.90	1.40	10.0	
	4	931.30	1.40	10.0	
	5	932.40	1.10	10.0	
5	0	933.10		5.0	
	1	933.90	0.80	5.0	
	2	934.70	0.80	5.0	
	3	935.30	0.60	5.0	
	4	936.00	0.70	5.0	
	5	936.80	0.80	5.0	

Test 5 **13.1** **16.1**

Step No.	Elapsed time (min)		Flow rate (gpm)	Gauge pressure (psi)	Comments
1	0	1144.00		4.0	no leaks
	1	1147.50	3.50	4.0	
	2	1151.50	4.00	4.0	
	3	1155.60	4.10	4.0	
	4	1159.60	4.00	4.0	
	5	1163.20	3.60	4.0	
	6	1166.40	3.20		
	7	1169.30	2.90		
2	0	1172.00		8.0	
	1	1176.20	4.20	8.0	
	2	1180.00	3.80	8.0	
	3	1184.10	4.10	8.0	
	4	1187.60	3.50	8.0	
	5	1191.30	3.70	8.0	
3	0	1202.00		12.0	
	1	1206.90	4.90	12.0	
	2	1211.60	4.70	12.0	
	3	1216.30	4.70	12.0	
	4	1221.00	4.70	12.0	
	5	1225.80	4.80	12.0	
4	0	1230.00		8.0	
	1	1233.60	3.60	8.0	
	2	1236.70	3.10	8.0	
	3	1240.10	3.40	8.0	
	4	1243.80	3.70	8.0	
	5	1247.20	3.40	8.0	
5	0	1249.00		4.0	
	1	1251.20	2.20	4.0	
	2	1253.60	2.40	4.0	
	3	1255.80	2.20	4.0	
	4	1258.30	2.50	4.0	
	5	1260.10	1.80	4.0	

Permeability Summary

MPV-04-123C

from	to		Step 1	Step 2	Step 3	Step 4	Step 5	Avg K
13.1	16.1	gauge (psi)	4	8	12	8	4	
		Qavg (igpm)	3.2	3.9	4.75	3.5	2.2	
		K cm/sec	**2.1E-03**	**1.3E-03**	**1.0E-03**	**1.2E-03**	**1.5E-03**	1.4E-03
16.1	19.1	gauge (psi)	5	10	15	10	5	
		Qavg (igpm)	0.8	1.4	1.9	1.3	0.7	
		K cm/sec	**4.2E-04**	**3.7E-04**	**3.4E-04**	**3.4E-04**	**3.7E-04**	3.7E-04
19.1	22.1	gauge (psi)	10	15	20	15	10	
		Qavg (igpm)	0.33	3	3.7	1.7	0.4	
		K cm/sec	**8.7E-05**	**5.3E-04**	**4.9E-04**	**3.0E-04**	**1.1E-04**	3.0E-04
22.1	25.1	gauge (psi)	15	20	25	20	15	
		Qavg (igpm)	1	1.4	1.55	1.2	0.97	
		K cm/sec	**1.8E-04**	**1.9E-04**	**1.6E-04**	**1.6E-04**	**1.7E-04**	1.7E-04
25.1	26.64	gauge (psi)	9.8	17	24.3	17.8	9	
		Qavg (igpm)	4.4	6.7	8.3	7	4.9	
		K cm/sec	**2.3E-03**	**2.0E-03**	**1.8E-03**	**2.0E-03**	**2.8E-03**	2.2E-03
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	

Equations:

$Hf = 8.65x10^{-15} (Q^2 * Lp/rp^5)$

$H_{nit} = (Dw'+Hg-Hf)+Pg/1.42$

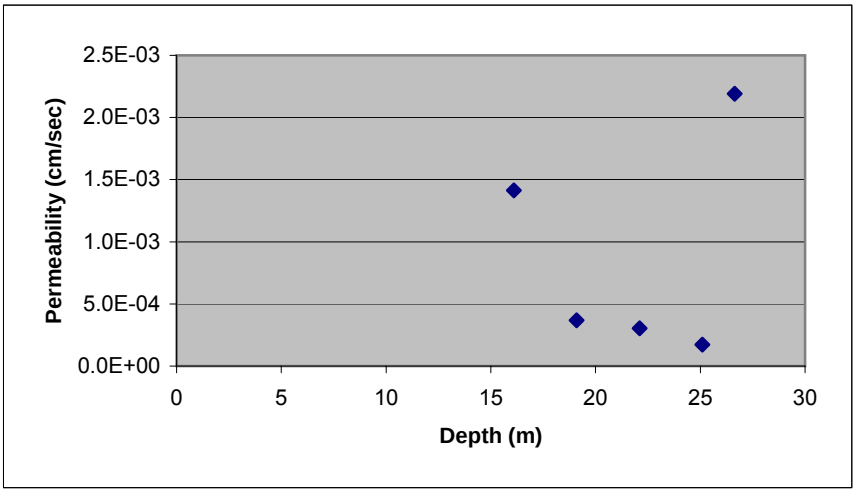
$K = (Q*Ln(R/r_b))/2*\pi*H_{nit}*L)$

Overall **8.9E-04**

assume
- vertical drillhole
- water at ground surface
- height of gauge is at rig flr
- negligible friction losses

Dw	Measured depth of static water (1)	*0*	m
Dp	Measured depth to packer		m
Dt	Depth to midpoint of test		m
Inc	Inclination from horizontal	*90*	m
Dw'	Vertical depth to static water level		°
Dp'	Vertical depth to packer		m
Dt'	Vertical depth to midpoint of test		m
Hg	Gauge height	*0*	m
Lp	Length of discharge pipe		m
rp	Radius of discharge pipe (1" = 0.0127m)		m
R	Radius of influence (10m is standard)	10	m
rb	Drillhole radius (HQ=0.048m, NQ=0.038m)	0.038	m
L	Length of test section		m
Hf		0	m

cm/sec

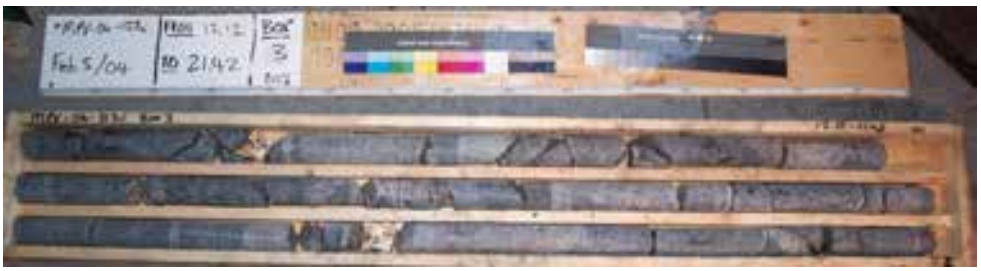


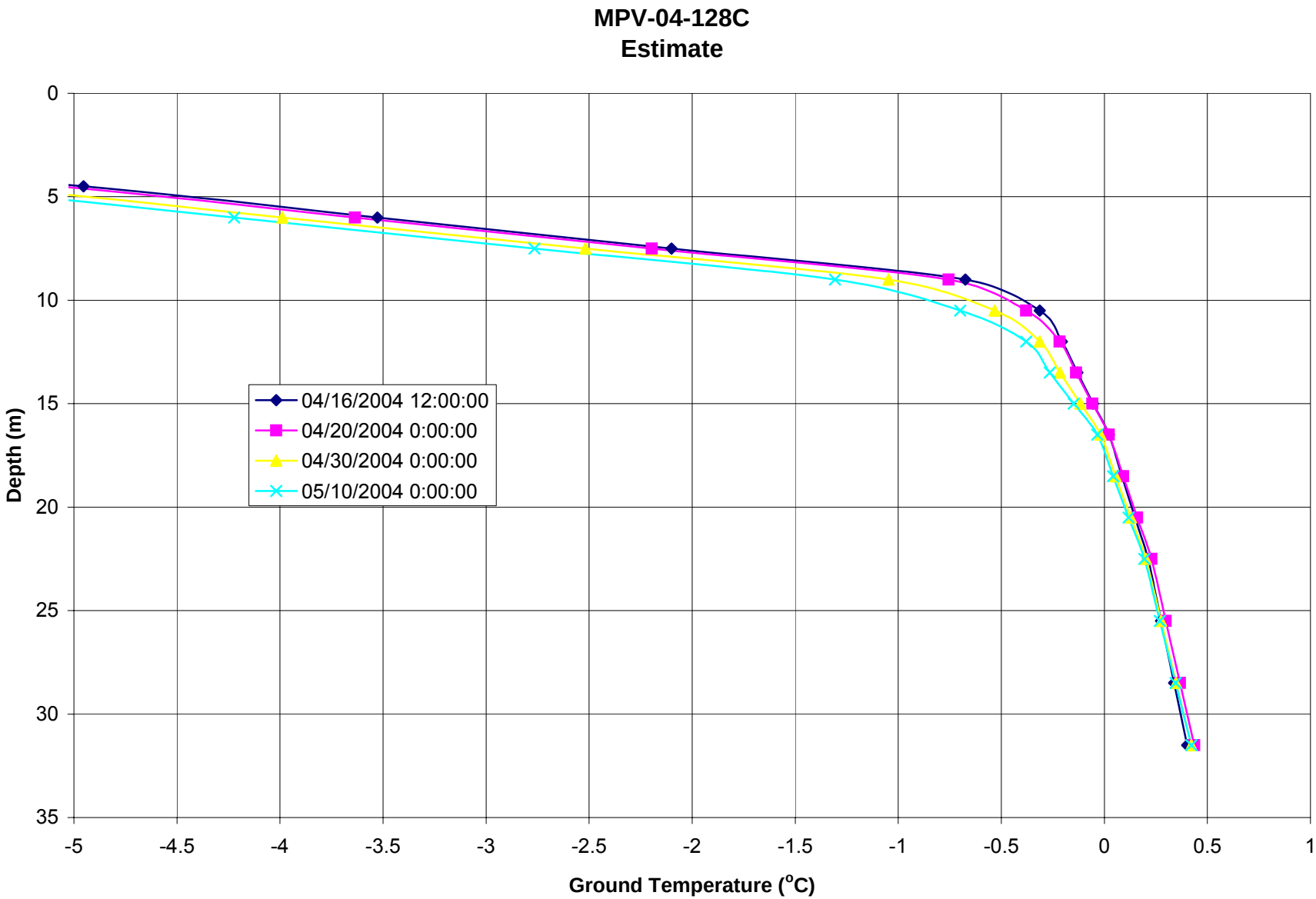
Reflex Readings

MPV-04-123C

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Field	Temp ©
Feb 5 2004	26.64	213.7	-88.8	75.2	5811	11

MPV_04_123C




MPV-04-128C
Estimate
Depth (m)
0
5
10
15
20
25
30
35
-5
-4.5
-4
-3.5
-3
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
Ground Temperature (°C)
04/16/2004 12:00:00
04/20/2004 0:00:00
04/30/2004 0:00:00
05/10/2004 0:00:00

MPV_04_128C


MPV.04.128c
Feb 7/04
FROM 3.90
TO 6.85
Box 1
DRY


MPV.04.128c
Feb 7/04
FROM 6.85
TO 9.76
Box 2
DRY


MPV.04.128c
07/02/2004
FROM 9.76
TO 12.65
Box 3
DRY


MPV.04.128c
07/02/2004
FROM 12.65
TO 15.42
Box 4
DRY


MPV.04.128c
07/02/2004
FROM 15.42
TO 18.30
Box 5
DRY

MPV_04_128C


MPV_04_128C
07/02/2006
FROM 18.30
TO 21.00
Box 6
DRY


MPV_04_128C
07/02/2006
FROM 21.00
TO 23.46
Box 7
DRY


MPV_04_128C
08/02/2006
TO 26.46
Box 8
DRY


MPV_04_128C
08/02/2006
FROM 29.5
TO 31.50
Box 10
DRY

Prep			
	All lengths measured along drillhole		
	rig floor = 0.0m; target length is 30.5m below ground surface		
	bedrock at 3.9m		
07/02/2004	**Dayshift**		
0700hrs	setting up		
0930hrs	set up complete		
1100hrs	ground surface at 1.4m		
	bedrock at 3.90m		
	casing set at 4.75m		
1230hrs	rods at 5.4m		
1330hrs	sanding between rods and casing; pulled rods at 6.2		
	drove additional casing to 6.3m (top at -1.1m below rig floor)		
1630hrs	stopped to get new pot valve		
1730hrs	restarted drilling		
1900hrs	finished shift at 14m		
07/02/2004	**Nightshift**		
1900hrs	Continued drilling HQ		
	Refreshed bit		
2030hrs	engine cut out. No battery power to engine		
	Battery charger found to jump start engine		
2200hrs	back to drilling		
0700hrs	finished shift at 24.0		
08/02/2004	**Dayshift**		
0700hrs	drilling merrily		
0830hrs	29.5m		
1030hrs	31.5m, end of hole, reflex test		
	Thermistor Installation		
	confirmed depth below ground surface, flushed rods		
	installed PVC tremie and circulated hot water		
	zero'ed' thermistor string in ice bath		
	threaded thermistor thru segmented thermistor PVC on ground		
	manhandled segmented string down thru drillshack roof		
	pulled rods, pulled casing, inserted protective steel sleeve		
	took thermistor readings - all thermistors active		
1330hrs	moved off hole		
	installed 5.1 lengths 1.25" dia PVC thermistor pipe (5.975m/length)		
	CAPPED BOTH PIPES and pulled rods		

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Engineers and Scientists

FIELD DRILL PERFORMANCE LOG

PROJECT:	**Gahcho Kue Geotech**
PROJECT NO:	**2CD002.11**
NORTHING:	7035111.5
EASTING:	588306.3
SURFACE ELEVATION:	405.87
AZIMUTH:	204
DIP:	70

HOLE NO:	**MPV-04-128C**
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	0930 07/02/04
DATE AND TIME FINISHED:	1330 Feb 8 2004
HOLE DIAMETER:	63.5 (HQ3)
DRILLING METHOD:	Diamond core
KIMBERLITE PIPE:	

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
DS 0700-1900	R Bowden	07/02/2004	1830	12	4.5	14	2.5 setup; 1hr sanded in; 1hr pot valve	14	7.5	1.87	12	4.5	7.5	1.87
NS 1900-0700	J Siddorn	08/02/2004	0630	12	1.5	27.00	engine cutout, no battery power	13	10.5	1.24	24	6	18	1.50
DS 0700-1900	R Bowden	08/02/2004	1830	12	9.5	31.50	therm installed then moved to next hole	4.5	2.5	1.80	36	15.5	20.5	1.54

OVERALL HOLE DRILL RATE (m/hr)	0.88
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	1.54

GEOTECH LOGGING 1 - INPUT (GENERAL GEOTECH LOG)

DRILLHOLE ID: **MPV-04-128C**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter)
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
0.00	1.40	1.40	ICE							ICE
1.40	3.90	2.50	OB							Till
3.90	5.40	1.50	GR	1.40	93.3	1.04	69.3	0.64	42.7	Bedrock
5.40	6.20	0.80	GR	0.76	95.0	0.39	48.8	0.31	38.8	Granite
6.20	8.55	2.35	GR	2.35	100.0	1.67	71.1	1.24	52.8	Granite
8.55	9.00	0.45	GR	0.45	100.0	0.21	46.7	0.12	26.7	Granite
9.00	12.00	3.00	GR	3.00	100.0	2.70	90.0	2.04	68.0	Granite
12.00	14.40	2.40	GR	2.40	100.0	1.90	79.2	1.71	71.3	Granite
14.40	15.00	0.60	GR	0.60	100.0	0.60	100.0	0.55	91.7	Make up to run, granite
15.00	18.00	3.00	GR	3.00	100.0	2.86	95.3	2.79	93.0	Foliated granite (gneissic)
18.00	21.00	3.00	GR	2.96	98.7	2.94	98.0	2.94	98.0	Foliated granite (gneissic)
21.00	24.00	3.00	GR	3.00	100.0	3.00	100.0	2.83	94.3	Foliated granite (gneissic)
24.00	27.00	3.00	GR	3.00	100.0	3.00	100.0	2.93	97.7	
27.00	29.50	2.50	GR	2.50	100.0	2.50	100.0	2.43	97.2	
29.50	31.50	2.00	GR	2.00	100.0	1.78	89.0	1.57	78.5	End of Hole
		0.00								
		0.00								
		0.00								
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GEOTECHNICAL LOGGING 2 - INPUT (DETAILED LOG)

DRILLHOLE ID: **MPV-04-128C**

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

FROM	TO	ROCK	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of			JOINT CONDITIONS				COMMENT
(m)	(m)	TYPE	% STRONG	% WEAK	OVERALL	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH	Sets	Type	Totals	ANGLE	ROUGH	ALT	FILL	
3.90	5.40	GR	100	0	100	18	0	18	0	0	0	0	2	J1	15		1	0	9	
			R6		R6									J2	3		4	1	9	
																				3 weathered joints are at various angles
5.40	6.20	GR	100	0	100	9	0	1	0	0	0	0	1	J1	1	0	1	0	9	
			R6		R6															
																				8 fractures perpendicular to the core, well ground, interpreted to be ma
6.20	8.55	GR	100	0	100	25	0	25	0	0	0	0	2+1	J1	2	28	1	2	9	
			R6		R6									J2	2	55	5	2	9	
														J3	21		1	0	9	
8.55	9.00	GR	100	0	100	8	0	8	0	0	0	0	1+1	J1	1	45	4	2	9	
			R6		R6									J2	7		1	0	9	
9.00	12.00	GR	100	0	100	26	0	26	0	0	1	0	1+1	J1	2	13	5	2	9	
			R6		R6									J2	24		1	0	9	
12.00	14.40	GR	100	0	100	24	0	17	0	0	1	0	2	J1	11	65	1	0	9	
			R5		R5									J2	5	55	3	0	9	
14.40	15.00	GR	100	0	100	2	0	1	0	0	0	0	1	J1	1	85	4	0	9	
			R5		R5															
15.00	18.00	GR	100	0	100	19	0	8	0	0	0	0	2	J1	4	51	4	0	9	
			R5		R5									J2	4	75	4	0	9	
																				Foliated granite (more like gneiss)
18.00	21.00	GR	100	0	100	13	0	3	0	0	0	0	1	J1	3	44	4	0	9	
			R5		R5															
																				Foliated granite (more like gneiss)
21.00	24.00	GR	100	0	100	13	0	5	0	0	0	0	2	J1	1	45	6	0	9	
			R5		R5									J2	4	65	4	0	9	
																				some calcite on J1
24.00	27.00	GR	100	0	100	16	0	16	0	0	1	0	2+1	J1	1	40	4	0	3	
			R5		R5									J2	8	64	4	0	9	
														J3	7		4	0	9	calcite on J1
27.00	29.50	GR	100	0	100	9	0	8	0	0	0	0	1+1	J1	4	70	1	0	9	
			R5		R5									J2	4		4	0	9	
29.50	31.50	GR	100	0	100	12	0	12	0	0	1	0	1+1	J1	6	70	4	0	9	
			R5		R5									J2	6		4	0	9	
																				END OF HOLE
					100															
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Validation data: (Do not alter)

IRS:	IRS:	Joint amounts:	Joint Fill Strength:		Microdefect Intensity:	Microdefect strength:		No of joint sets:	Joint type:	Joint Roughness:	Joint Wall Alteration:	Joint Infill:	
%:	Categories:	0	0		0	0		1	J1	1	0	1	
0	R0	1	1		1	1		1+1	J2	2	1	2	
5	R1	2	2		2	2		2	J3	3	2	3	
10	R2	3			3			2+1		4		4	
15	R3	4						3		5		5	
20	R4	5						3+1		6		6	
25	R5	6								7		7	
30	R6	7								8		8	
35		8								9		9	
40		9											
45		10											
50		11											
55		12											
60		13											
65		14											
70		15											
75		16											
80		17											
85		18											
90		19											
95		20											
100		21											
		22											
		23											
		24											
		25											
		26											
		27											
		28											
		29											
		30											

SRK Photo Log Sheet

Drillhole ID: **MPV-04-128C**

Shift	Camera Photo Number	Filename	Depth	Description
DS 0700-1900	89	MPV-04-128c-3.90-dry-Box1.JPG	3.90 - 6.85	Core Box 1 Granite
DS 0700-1900	90	MPV-04-128c-6.85-dry-Box2.JPG	6.85 - 9.76	Core Box 2 Granite
NS 1900-0700	92	MPV-04-128c-9.76-dry-Box3.JPG	9.76 - 12.65	Core Box 3 Granite
NS 1900-0700	93	MPV-04-128c-12.65-dry-Box4.JPG	12.65 - 15.42	Core Box 4 Granite w/ some pegmatite veins
NS 1900-0700	94	MPV-04-128c-15.42-dry-Box5.JPG	15.42 - 18.30	Core Box 5 Granite/gneiss
NS 1900-0700	96	MPV-04-128c-18.30-dry-Box6.JPG	18.30 - 21.00	Core Box 6 Granite/gneiss
NS 1900-0700	97	MPV-04-128c-21.00-dry-Box7.JPG	21.00 - 23.84	Core Box 7 Granite
DS 0700-1900	98	MPV-04-128c-23.84-dry-Box8.JPG	23.84 - 26.66	Core Box 8 Granite
DS 0700-1900	100	MPV-04-128c-26.66-dry-Box9.JPG	26.66 - 29.50	Core Box 9 Granite
DS 0700-1900	101	MPV-04-128c-29.50m-dry-Box10.JPG	29.50 - 31.50	Core Box 10 Granite - END OF HOLE

Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-128C	1	3.90	6.85
MPV-04-128C	2	6.85	9.76
MPV-04-128C	3	9.76	12.65
MPV-04-128C	4	12.65	15.42
MPV-04-128C	5	15.42	18.30
MPV-04-128C	6	18.30	21.00
MPV-04-128C	7	21.00	23.84
MPV-04-128C	8	23.84	26.66
MPV-04-128C	9	26.66	29.50
MPV-04-128C	10	29.50	31.50
	11	**31.50**	EOH
	12		
	13		
	14		
	15		
	16		
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	21		
	22		
	23		
	24		
	25		
	26		
	27		
	28		
	29		
	30		

MPV-04-128c

Ice Bath Readings

1	16.40
2	16.36
3	16.35
4	16.39
5	16.32
6	16.31
7	16.34
8	16.32
9	16.39
10	16.40
11	16.34
12	16.31
13	16.30
14	16.30
15	16.27
16	16.32

FIELD GEOLOGICAL LOG

HOLE ID MPV-04-128c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	1.40	Ice/water	n/a	Ice/water	RB/JS
1.40	3.90	Overburden	n/a	Till	RB/JS
3.90	31.50	Granite	n/a	Granite; 15.0-24.0m: foliated granite, gneissic	RB/JS
EOH					

Reflex Readings **MPV-04-128C**

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Field	Temp ©
Feb 8 2004	31.5	187.9	69	234.8	5884	10.7

UCS SAMPLES

HOLE ID: MPV-04-128C

HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-128C	10	30.12	Granite	04-UCS-128-001

POINT LOAD TEST - INPUT

DRILL HOLE ID:

No. #	Tested by	DATE	HOLE/ FACE ID	DIST. (m)	ROCK TYPE	TEST TYPE	ORINT	DAYS	W (mm)	D (mm)	P (kN)	COMMENT
1	J Delgaty	###########	MPV-04-128C	29.78	Granite	1				63.60	18.54	Medium grained, pink/grey granite - a good clean break
2	J Delgaty	###########	MPV-04-128C	to	Granite	1				63.60	19.34	Medium grained, pink/grey granite - a good clean break
3	J Delgaty	###########	MPV-04-128C	30.12	Granite	1				63.60	10.05	Medium grained, pink/grey granite - a good clean break
1	J Delgaty	###########	MPV-04-128C	30.42	Granite	1				63.60	12.51	Medium grained, pink/grey granite - a good clean break
2	J Delgaty	###########	MPV-04-128C	to	Granite	1				63.60	14.53	Medium grained, pink/grey granite - a good clean break
3	J Delgaty	###########	MPV-04-128C	30.63	Granite	1				63.60	14.42	Medium grained, pink/grey granite - a good clean break

MPV_04_129C


MPV 04 129C
From:
To: 7.15m
Box: 1
DRY.


MPV 04 129C
From: 7.15m
To: 9.90m
Box: 2
DRY.


MPV 04 129C
From:
To: 12.60
Box: 3
DRY.


MPV 04 129C
From: 12.60m
To: 15.60m
Box: 4
DRY.


MPV 04 129C
From: 15.60m
To: 17.75m
Box: 5
DRY.


MPV 04 129C
From: 17.75
To: 20.30
Box: 6
DRY.

MPV_04_129C


MPV 04 129C
20.30
23.30
7
DRY


MPV 04 129C
23.30
26.00
8
DRY


MPV 04 129C
26.00
28.65
9
DRY


MPV 04 129C
28.65
31.10
10
DRY


MPV 04 129C
31.10
32.50
11
DRY

Date/Time	**Event**
DS 08/02/2004	
1730hrs	completed set-up on hole
	ground surface is 2.0m below rig floor
NS 08/02/04-09/02/04	
2000hrs	set casing to 4.7m (just below rig floor)
2200hrs	began to drill
2200-2300hrs	adjust return funnel and build frame for it
	Till from 2m - 4.3m
	Bedrock (granite) intersected at 4.3m
0015-0030 hrs	water line break in seacan
0630hrs	17.00m depth reached by end of shift
DS 09/02/04	
0800hrs	at 20.5m
1000hrs	26.5m
1100hrs	29.5m
1130hrs	31.0m
1200hrs	32.5m
1430hrs	thermistor installed, started packing to move

SRK Consulting
Engineers and Scientists

FIELD DRILL PERFORMANCE LOG

PROJECT:	**Gahcho Kue Geotech**
PROJECT NO:	**2CD002.11**
NORTHING:	7035595.2
EASTING:	588920.5
SURFACE ELEVATION:	404.21
AZIMUTH:	204
DIP:	70

HOLE NO:	**MPV-04-129C**
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	08/02/04 1900hrs
DATE AND TIME FINISHED:	1400 Feb 9 2004
HOLE DIAMETER:	101.6 (HQ3) & 47.6 mm (NQ)
DRILLING METHOD:	Geobore and diamond core
KIMBERLITE PIPE:	Dyke 2 abutment

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
DS 0700-1900	R Bowden	08/02/2004	1830	12	12	0	completed set-up at 1730	0	0	0.00	0	12	0	0.00
NS 1900-0700	J Siddorn	08/02/2004	0630	12	3.5	20.25	set casing to 6.2m, adjust return funnel,	20.25	8.5	2.38	12	15.5	8.5	2.38
DS 0700-1900	R Bowden	09/02/2004		12	7	32.50		12.25	5	2.45	24	22.5	13.5	2.41

OVERALL HOLE DRILL RATE (m/hr)	0.90
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	2.41

GEOTECH LOGGING 1 - INPUT (GENERAL GEOTECH LOG)

DRILLHOLE ID: **MPV-04-129C**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
0.00	2.00	2.00	ICE							Ice from rig floor to till, 2m
2.00	4.30	2.30	OB							Till 2.3m thick
4.30	5.50	1.20	GR	1.20	100.0	1.11	92.5	1.11	92.5	Bedrock (granite) intersected at 4.3m
5.50	8.50	3.00	GR	3.00	100.0	2.85	95.0	2.85	95.0	
8.50	11.50	3.00	GR	3.00	100.0	2.86	95.3	2.86	95.3	
11.50	14.25	2.75	GR	2.75	100.0	2.72	98.9	2.65	96.4	Short run
14.25	17.25	3.00	GR	3.00	100.0	2.82	94.0	2.20	73.3	Highly fractured (brecciated) in last metre of run
17.25	20.30	3.05	GR	3.05	100.0	2.92	95.7	2.83	92.8	
20.30	23.50	3.20	GR	3.20	100.0	3.20	100.0	3.08	96.3	
23.50	26.50	3.00	GR	3.00	100.0	2.90	96.7	2.77	92.3	
26.50	29.50	3.00	GR	3.00	100.0	2.87	95.7	2.78	92.7	
29.50	31.10	1.60	GR	1.60	100.0	1.51	94.4	1.51	94.4	
31.10	32.50	1.40	GR	1.40	100.0	1.26	90.0	1.20	85.7	END OF HOLE
		0.00								
		0.00								
		0.00								
		0.00								
		0.00								
		0.00								
		0.00								
		0.00								
		0.00								
		0.00								
		0.00								
		0.00								

GEOTECHNICAL LOGGING 2 - INPUT (DETAILED LOG)

DRILLHOLE ID: **MPV-04-129C**

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

FROM	TO	ROCK	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of			JOINT CONDITIONS				COMMENT
(m)	(m)	TYPE	% STRONG	% WEAK	OVERALL	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH	Sets	Type	Totals	ANGLE	ROUGH	ALT	FILL	
4.30	5.50	GR	100	0	100	8	0	3	0	0	0	0	1	J1	3	70	6	0	6	
			R5		R5															
5.50	8.50	GR	100	0	100	16	0	9	0	0	0	0	2	J1	7	42	4	0	9	
			R5		R5									J2	2	45	6	0	9	
8.50	11.50	GR	100	0	100	16	0	6	0	0	0	0	2	J1	2	46	4	0	9	
			R5		R5									J2	4	55	4	0	9	
11.50	14.25	GR	100	0	100	18	0	6	0	0	0	0	3	J1	2	45	4	0	9	
			R5		R5									J2	3	60	8	0	9	
														J3	1	25	7	0	3	Some iron staining (hematite) on J3
14.25	16.25	GR	100	0	100	12	0	11	0	0	0	0	3	J1	6	70	7	0	9	
			R5		R5									J2	4	45	7	0	9	
														J3	1	25	4	0	9	
16.25	17.25	GR	100	0	100	15	0	10	0	0	0	0	2+1	J1	3	25	7	0	9	
			R5		R5									J2	3	70	4	0	9	
																				Highly fractured (brecciated) last metre of run 14.25-17.25m depth
17.25	20.30	GR	100	0	100	14	0	7	0	0	1	0	1+1	J1	3	48	5	0	3	
			R5		R5									J2	4		4	0	9	
																				some calcite
20.30	23.50	GR	100	0	100	14	0	7	0	0	0	0	1+1	J1	1	26	5	0	3	
			R5		R5									J2	6		2	0	9	
																				J1 has extensive calcite coating
23.50	26.50	GR	100	0	100	17	0	15	0	0	1	0	2+1	J1	3	55	7	0	3	
			R5		R5									J2	1	30	7	1	9	
														J3	11		4	0	9	J1 has calcite coating and hematite staining; J2 is weathered
26.50	29.50	GR	100	0	100	17	0	5	0	0	0	0	1+1	J1	2	50	5	0	3	
			R5		R5									J2	2	72	4	0	9	
29.50	31.10	GR	100	0	100	9	0	3	0	0	0	0	2	J1	2	40	5	0	3	
			R5		R5									J2	1	62	3	0	9	
																				J1 has calcite coating
31.10	32.50	GR	100	0	100	12	0	1	0	0	0	0	1	J1	1	64	4	0	9	
			R5		R5															
					100															
					100															

SRK Photo Log Sheet

Drillhole ID: **MPV-04-129C**

Shift	Camera Photo Number	Filename	Depth	Description
NS 1900-0700	302	MPV-04-129c_4.3m_Box1_dry	4.3 - 7.15	Granite Box 1
NS 1900-0700	304	MPV-04-129c_7.15m_Box2_dry	7.15 - 9.90	Granite Box 2
NS 1900-0700	305	MPV-04-129c_9.90m_Box3_dry	9.90 - 12.60m	Granite Box 3
NS 1900-0700	306	MPV-04-129c_12.60m_Box4_dry	12.60 - 15.40m	Granite Box 4
DS 0700-1900		MPV-04-129c_15.40m_Box5_dry	15.40 - 17.75	Core Box 5
DS 0700-1900		MPV-04-129c_17.75m_Box6_dry	17.75 - 20.30	Core Box 6
DS 0700-1900		MPV-04-129c_20.30m_Box7_dry	20.30 - 23.30	Core Box 7
DS 0700-1900		MPV-04-129c_23.30m_Box8_dry	23.30 - 26.00	Core Box 8
DS 0700-1900		MPV-04-129c_26.00m_Box9_dry	26.00 - 28.65	Core Box 9
DS 0700-1900		MPV-04-129c_28.65m_Box10_dry	28.65 - 31.1	Core Box 10
DS 0700-1900		MPV-04-129c_31.1m_Box11_dry	31.1 - 32.5	Core Box 11 END OF HOLE

Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-129C	1	4.30	7.15
MPV-04-129C	2	7.15	9.90
MPV-04-129C	3	9.90	12.60
MPV-04-129C	4	12.60	15.40
MPV-04-129C	5	15.40	17.25
MPV-04-129C	6	17.25	20.30
MPV-04-129C	7	20.30	23.30
MPV-04-129C	8	23.30	26.00
MPV-04-129C	9	26.00	28.65
MPV-04-129C	10	28.65	31.10
MPV-04-129C	11	31.10	32.50
END OF HOLE		**32.50**	

FIELD GEOLOGICAL LOG

HOLE ID MPV-04-129c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	2.00	Ice/water	n/a	Ice/water	RB/JS
2.00	4.20	Overburden	n/a	Till	RB/JS
4.20	32.50	Granite	n/a	Granite	RB/JS
EOH					

Reflex Readings **MPV-04-129C**

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Field	Temp ©
Feb 9 2004	32.5	185.6	69.3	202.5	5909	8.1

POINT LOAD TEST - INPUT

DRILL HOLE ID:

No. #	Tested by	DATE	HOLE/ FACE ID	DIST. (m)	ROCK TYPE	TEST TYPE	ORINT	DAYS	W (mm)	D (mm)	P (kN)	COMMENT
1	J Delgaty	###########	MPV-04-129C	17.99	Granite	1				63.80	16.91	White/grey, medium grained granite - a good clean break
2	J Delgaty	###########	MPV-04-129C	to	Granite	1				63.80	12.56	White/grey, medium grained granite - a good clean break
3	J Delgaty	###########	MPV-04-129C	18.30	Granite	1				63.80	29.81	White/grey, medium grained granite - a good clean break
1	J Delgaty	###########	MPV-04-129C	18.56	Granite	1				63.80	16.06	White/grey, medium grained granite - a good clean break
2	J Delgaty	###########	MPV-04-129C	to	Granite	1				63.80	20.50	White/grey, medium grained granite - a good clean break
3	J Delgaty	###########	MPV-04-129C	18.77	Granite	1				63.80	25.31	White/grey, medium grained granite - a good clean break

UCS SAMPLES

HOLE ID: MPV-04-129C

HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-129C	6	18.32	Granite	04-UCS-129-001

Ice Bath Readings		
Thermistor String ID		ID 32/16-3
Thermistor	Ohm Reading	
1	15.91	
2	15.45	
3	15.82	
4	15.68	
5	15.52	
6	15.86	
7	15.96	
8	15.54	
9	16.06	
10	16.05	
11	15.96	
12	15.60	
13	15.57	
14	16.12	
15	15.93	
16	16.12	

GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	*DESCRIPTION*	*Mpa*
R0	EXTREMELY WEAK ROCK	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	VERY WEAK ROCK	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	WEAK ROCK	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	MEDIUM STRONG ROCK	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	STRONG ROCK	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	VERY STRONG ROCK	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	EXTREMELY STRONG ROCK	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY	
CODE	*DESCRIPTION*
0	NONE
1	MINOR
2	MODERATE
3	HEAVY

DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	*CATEGORY*
0	STRONG (NEVER BREAKS)
1	MODERATE (SOMETIMES BREAKS)
3	WEAK (ALWAYS BREAKS)

JOINT CONDITION - SMALL SCALE		
CODE	*CATEGORY*	*SUBCATEGORY*
1	STEPPED	ROUGH
2		SMOOTH
3		SLICKENSIDED
4	UNDULATING	ROUGH
5		SMOOTH
6		SLICKENSIDED
7	PLANAR	ROUGH
8		SMOOTH
9		SLICKENSIDED

JOINT FILLING		
CODE	*CATEGORY*	*SUBCATEGORY*
1	NON	COARSE
2	SOFTENING	MEDIUM
3		FINE
4	SOFT	COARSE
5	SHEARED	MEDIUM
6		FINE
7	GOUGE THIKNESS < IRREGULARITIES	
8	GOUGE THIKNESS > IRREGULARITIES	
9	NO INFILL	

JOINT ALTERATION	
CODE	*DESCRIPTION*
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE

Laubscher	Jr	JRC
1	4	20
2	3	14
3	2	11

STEPPED

4	3	14
5	2	11
6	1.5	7

UNDULATING

7	1.5	2.5
8	2	1.5
9	0.5	0.5

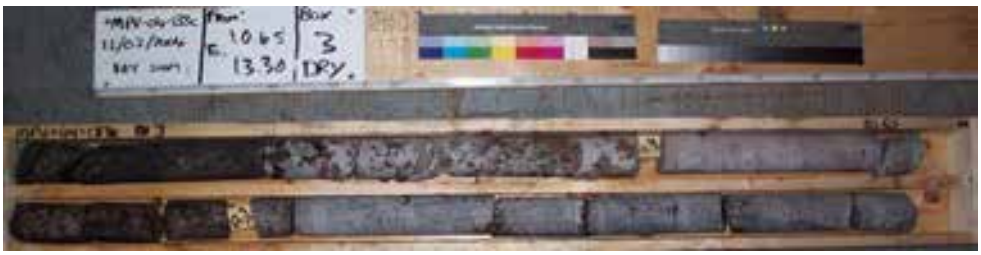
PLANAR

STEFFEN, ROBERTSON AND KIRSTEN
Consulting Engineers

MPV_04_131C

MPV_04_131C

MPV_04_133C



MPV_04_133C


19.10
21.80
6
DRY.


21.80
24.70
7
DRY.


24.70
27.50
8
DRY.


27.50
30.15
9
DRY.


30.15
31.10
10
DRY.

MPV-04-133c			
NS 11/02/2004			
1900hrs	Setup on hole		
2200hrs	Ream casing		
0100hrs	Casing down to 5.3m		
????	Began drilling		
???	end of shift at XXXm		
DS 11/02/2004			
0700hrs	drilling		
0830hrs	17.6m		
0950hrs	20.6m		
1030hrs	23.6m		
1110hrs	26.6m		
1140hrs	29.6m		
1230hrs	31.0m	End of Hole	
	waited for reflex		
1500hrs	thermistor installed		
	began packing to move		

SRK Consulting
Engineers and Scientists

FIELD DRILL PERFORMANCE LOG

PROJECT:	**Gahcho Kue Geotech**
PROJECT NO:	**2CD002.11**
NORTHING:	7035350.3
EASTING:	588816
SURFACE ELEVATION:	404.71
AZIMUTH:	24
DIP:	70

HOLE NO:	**MPV-04-133c**
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	1700hrs 10/2/2004
DATE AND TIME FINISHED:	1500hrs 12/2/2004
HOLE DIAMETER:	63.5 (HQ)
DRILLING METHOD:	Diamond core

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
NS 1900-0700	J Siddorn	02/11/2004	0630	12	6	11.4	drill setup	11.4	6	1.90	12	6	6	1.90
DS 0700-1900	R Bowden	12/02/2004	1830	12	6.5	31.00	reflex, thermistor, pack and move	19.6	5.5	3.56	24	12.5	11.5	2.70

OVERALL HOLE DRILL RATE (m/hr)	1.29
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	2.70

GEOTECH LOGGING 1 - INPUT (GENERAL GEOTECH LOG)

DRILLHOLE ID: **MPV-04-133c**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
5.45	8.60	3.15	GR	3.15	100.0	3.11	98.7	3.03	96.2	Granite bedrock
8.60	11.60	3.00	GR	2.95	98.3	2.88	96.0	2.78	92.7	Granite
11.60	12.30	0.70	GR	0.70	100.0	0.70	100.0	0.63	90.0	Granite
12.30	14.60	2.30	GR	2.25	97.8	2.25	97.8	2.19	95.2	Granite
14.60	17.60	3.00	GR	3.00	100.0	2.87	95.7	2.80	93.3	Granite
17.60	20.60	3.00	GR	3.00	100.0	2.95	98.3	2.70	90.0	Granite
20.60	23.60	3.00	AP/GR	3.00	100.0	3.00	100.0	3.00	100.0	Amphibolite and granite
23.60	26.60	3.00	AP/GR	3.00	100.0	2.86	95.3	2.65	88.3	Amphibolite and granite
26.60	29.60	3.00	AP/GR	3.00	100.0	2.81	93.7	2.75	91.7	Amphibolite and granite
29.60	31.00	1.40	AP/GR	1.40	100.0	1.40	100.0	1.34	95.7	Amphibolite and granite - END OF HOLE
		0.00								
		0.00								
		0.00								
		0.00								
		0.00								
		0.00								
		0.00								
		0.00								
		0.00								
		0.00								
		0.00								
		0.00								
		0.00								
		0.00								
		0.00								

GEOTECHNICAL LOGGING 2 - INPUT (DETAILED LOG)

DRILLHOLE ID:

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

FROM	TO	ROCK	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of			JOINT CONDITIONS				COMMENT
(m)	(m)	TYPE	STRONG R	WEAK R	% WEAK	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH	Sets	Type	Totals	ANGLE	ROUGH	ALT	FILL	
5.5	8.6	GR	R5		0	15	0	5	0	0	0	0	2	J1	2	45	4	0	9	
														J2	3	60	4	0	9	
8.6	11.6	GR	R5		0	16	0	8	0	0	1	0	1	J1	8	70	5	0	9	
11.6	12.3	GR	R5		0	4	0	0	0	0	0	0	1		0					
12.3	14.6	GR	R5		0	12	0	6	0	0	0	0	2	J1	5	70	5	0	9	
														J2	1	37	5	0	9	
14.6	17.6	GR	R5		0	15	0	9	9	0	0	0	3	J1	1	47	4	0	9	
														J2	3	57	4	0	9	
														J3	5	65	4	0	9	
17.6	20.6	GR	R5		0	18	0	17	0	0	0	0	2	J1	11	60	4	0	9	
														J2	7	70	7	0	9	
20.6	23.6	GR	R5		0	11	0	10	0	0	0	0	3	J1	5	50	5	0	9	
														J2	2	25	5	0	9	
														J3	3		4	0	9	one J2 joint has partial calcite coatin
23.6	26.6	GR	R5		0	16	0	11	0	0	0	0	3	J1	5	67	4	0	9	
														J2	3	33	4	0	9	
														J3	3	90	4	0	9	all joint sets are calcite or hematite staine
26.6	29.6	GR	R5		0	16	0	8	0	0	0	0	3	J1	5	65	5	0	9	
														J2	3	25	7	0	9	
														J3	1	80	1	0	9	J1 and J2 have calcite coating;
29.6	31.1	GR	R5		0	6	0	4	0	0	0	0	3	J1	2	30	4	0	9	
														J2	1	40	5	0	9	
														J3	1	80	1	0	9	J2 has calcite coating; J3 is WEAK micaceous ban

SRK Photo Log Sheet

Drillhole ID: **MPV-04-133c**

Shift	Camera Photo Number	Filename	Depth	Description
NS 1900-0700	372	MPV-04-133c_5.45m_Box1_DRY	5.45 - 7.7m	Granite Box 1
NS 1900-0700	373	MPV-04-133c_7.7m_Box2_DRY	7.7 - 10.65 m	Granite Box 2
DS 0700-1900		MPV-04-133c_10.65m_Box3_DRY	10.65 - 13.3m	Granite Box 3
DS 0700-1900		MPV-04-133c_13.30m_Box4_DRY	13.30 - 16.25	Granite Box 4
DS 0700-1900		MPV-04-133c_16.25m_Box5_DRY	15.25 - 19.10	Box 5
DS 0700-1900		MPV-04-133c_19.10m_Box6_DRY	19.10 - 21.80	Box 6
DS 0700-1900		MPV-04-133c_21.80m_Box7_DRY	21.80 - 24.7	Box 7
		MPV-04-133c_24.0m_Box8_DRY	24.70 - 27.50	Box 8
		MPV-04-133c_27.5m_Box9_DRY	27.5 - 30.15	Box 9
		MPV-04-133c_30.15m_Box10_DRY	30.15 - 31.10	END OF HOLE

Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-133c	1	5.45	7.70
MPV-04-133c	2	7.70	10.65
MPV-04-133c	3	10.65	13.30
MPV-04-133c	4	13.30	16.25
MPV-04-133c	5	16.25	19.10
MPV-04-133c	6	19.10	21.80
MPV-04-133c	7	21.80	24.70
MPV-04-133c	8	24.70	27.50
MPV-04-133c	9	27.50	30.15
MPV-04-133c	10	30.15	31.10
MPV-04-133c	11	31.10	**End of Hole**
	12		
	13		
	14		
	15		
	16		
	17		
	18		
	19		
	20		
	21		
	22		
	23		
	24		
	25		
	26		
	27		
	28		
	29		
	30		

Borehole ID	**MPV-04-133c**
Thermistor String ID	**16/32 - 2**

Ice Bath Readings

Thermistor	Reading (kOhms)	Comments
1	16.40	
2	16.31	
3	16.31	
4	16.28	
5	16.35	
6	16.28	
7	16.36	
8	16.31	
9	16.29	
10	16.31	
11	16.36	
12	16.37	
13	16.35	
14	16.34	
15	16.40	
16	16.31	

Reflex Readings

MPV-04-133C

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N	Magnetic Fielc	Temp ©
Feb 12 2004	31	18.1	68.5	73.4	5895	9.1

FIELD GEOLOGICAL LOG

HOLE ID MPV-04-133c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	5.45	Overburden	n/a	Overburden	RB/Clee
5.45	20.60	Granite	n/a	Granite	RB/CLee
20.60	31.00	Granite and Amphibolite	n/a	Granite and Amphibolite	RB/CLee
EOH					

GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH

	CATEGORY	DESCRIPTION	Mpa
R0	EXTREMELY WEAK ROCK	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	VERY WEAK ROCK	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	WEAK ROCK	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	MEDIUM STRONG ROCK	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	STRONG ROCK	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	VERY STRONG ROCK	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	EXTREMELY STRONG ROCK	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY

CODE	DESCRIPTION
0	NONE
1	MINOR
2	MODERATE
3	HEAVY

DROP TEST - CEMENTED JOINTS/DEFECTS

CODE	CATEGORY
0	STRONG (NEVER BREAKS)
1	MODERATE (SOMETIMES BREAKS)
3	WEAK (ALWAYS BREAKS)

JOINT CONDITION - SMALL SCALE

CODE	CATEGORY	SUBCATEGORY
1	STEPPED	ROUGH
2		SMOOTH
3		SLICKENSIDED
4	UNDULATING	ROUGH
5		SMOOTH
6		SLICKENSIDED
7	PLANAR	ROUGH
8		SMOOTH
9		SLICKENSIDED

JOINT FILLING

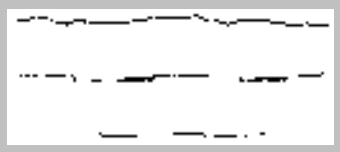
CODE	CATEGORY	SUBCATEGORY
1	NON	COARSE
2	SOFTENING	MEDIUM
3		FINE
4	SOFT	COARSE
5	SHEARED	MEDIUM
6		FINE
7	GOUGE THIKNESS < IRREGULARITIES	
8	GOUGE THIKNESS > IRREGULARITIES	
9	NO INFILL	

JOINT ALTERATION

CODE	DESCRIPTION
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

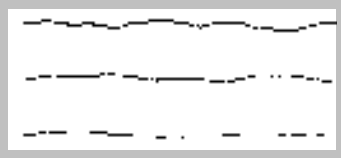
JOINT CONDITIONS - SMALL SCALE

	Laubscher	Jr	JRC
ROUGH	1	4	20
SMOOTH	2	3	14
SLICKEN-SIDED	3	2	11



STEPPED

ROUGH	4	3	14
SMOOTH	5	2	11
SLICKEN-SIDED	6	1.5	7



UNDULATING

ROUGH	7	1.5	2.5
SMOOTH	8	2	1.5
SLICKEN-SIDED	9	0.5	0.5

PLANAR

SRK STEFFEN, ROBERTSON AND KIRSTEN
Consulting Engineers

POINT LOAD TEST - INPUT

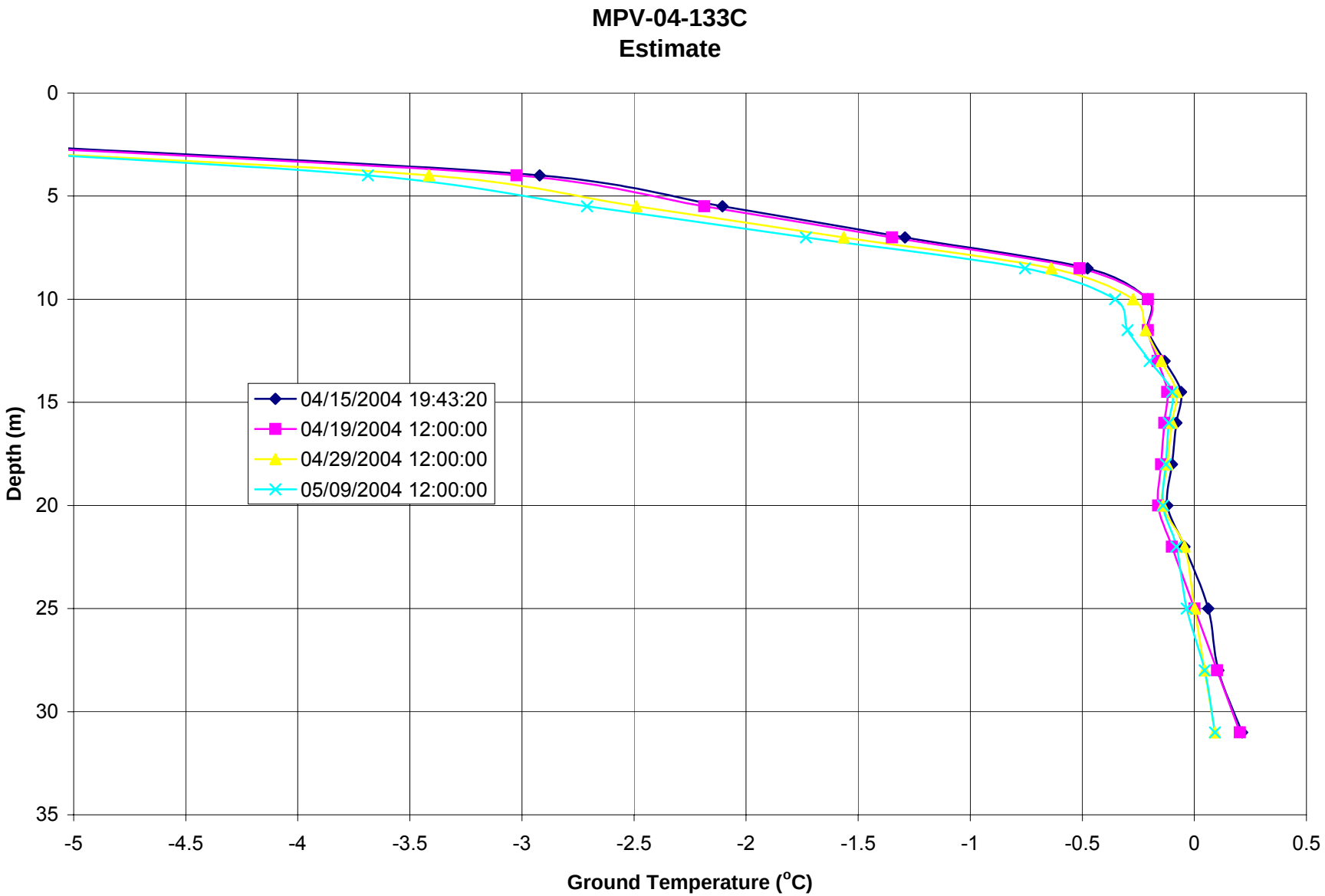
DRILL HOLE ID: **MPV-04-133C**

No. #	TESTED BY	DATE	HOLE/ FACE ID	DIST. (m)	ROCK TYPE	TEST TYPE	ORINT	DAYS	W (mm)	D (mm)	P (PSI)	COMMENT	
	BAM	04/07/2004	MPV-04-133C	27.60	GRANITE	1	LEFT			63.50	3150.00	GOOD BREAK	
	BAM	04/07/2004	MPV-04-133C	28.50	GRANITE	1	RIGHT			63.50	2300.00	FAIR BREAK	ANGLED
	BAM	04/07/2004	MPV-04-133C	28.50	GRANITE	1	RIGHT			63.50	3050.00	GOOD BREAK	
	BAM	04/07/2004	MPV-04-133C	28.50	GRANITE	1	RIGHT			63.50	2850.00	FAIR BREAK	
No. #	**TESTED BY**	**DATE**	HOLE/ FACE ID	**DIST. (m)**	ROCK TYPE	**TEST TYPE**	**ORINT**	**DAYS**	**W (mm)**	**D (mm)**	**P (kN)**	**COMMENT**	
	JD	03/02/2004	MPV-04-133C								12.59		

UCS SAMPLES

HOLE ID: MPV-04-133C

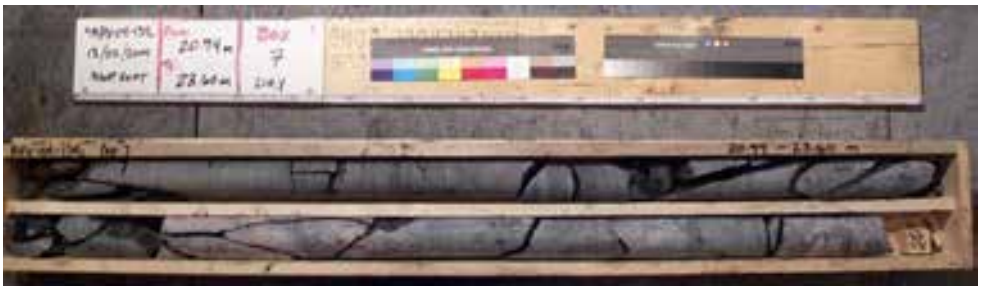
HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-133C	9	27.76	Grante	04-UCS-133-001


MPV-04-133C
Estimate
Depth (m)
0
5
10
15
20
25
30
35
-5
-4.5
-4
-3.5
-3
-2.5
-2
-1.5
-1
-0.5
0
0.5
Ground Temperature (°C)
04/15/2004 19:43:20
04/19/2004 12:00:00
04/29/2004 12:00:00
05/09/2004 12:00:00

MPV_04_134C

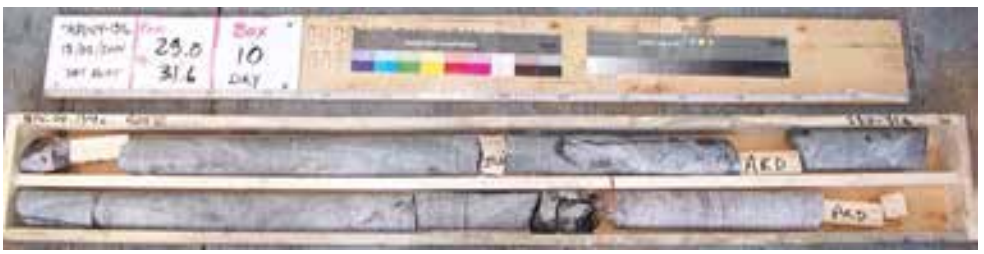
MPV_04_134C


Box
6
DRY


Box
7
DRY


23.6
26.6
Box
8
DRY
ARD
ARD
ARD


26.6
29.6
Box
9
DRY
ARD
ARD


29.6
31.6
Box
10
DRY
ARD
ARD

NS 12/02/2004

1900 - 2230 hrs	move, setup shacks
2230 - 0000 hrs	drill azimuth: used stakes for D4-A-3T, -4T and GB-1 (JAN 27 survey) for average line of site (holes poorly aligned)
0000 - 0200 hrs	pack in shacks, auger hole for pump shack (2 tries before hitting water), set in pump shack
0200 - 0430 hrs	laying and burying hose, fix leaky pump, setup/organize drill shack
0530 -	setting casing, fixing stove

DS 13/02/2004

0700hrs	
1100hrs	installed funnel on casing to catch cuttings
1230hrs	rods and casing bound by sand
	set casing to 7.8m
1430hrs	ground at 1.6m below rig floor
	bedrock at 8.2
1600hrs	8.6m
1700hrs	changed bit to 02 type (harder). No more 01 type bits in camp
1815hrs	9.5m

NS 13/02/2004

1900 - 0700 hrs	Drillers told to use 1.5m distance from drill floor to top of head
	slow drilling due to hard bit (#2 as opposed to #10 bit)

DS 13/02/2004

0730hrs	27.9m partial run to remove blocked bit/ high water pressures
0830hrs	changed bit (after only 19.1m of drilling). Dead.
1000hrs	29.6m
1040hrs	31.6m **END OF HOLE**
	reflex, thermistor, packed and moved to D4-A-2T
	protective pipe installed over thermistor

SRK Consulting
Engineers and Scientists

FIELD DRILL PERFORMANCE LOG

PROJECT:	**Gahcho Kue Geotech**
PROJECT NO:	**2CD002.11**
NORTHING:	7035626.06
EASTING:	589329.64
SURFACE ELEVATION:	405.57
AZIMUTH:	310
DIP:	70

HOLE NO:	**MPV-04-134c**
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	1200 13/2/2004
DATE AND TIME FINISHED:	1600 Feb 14 2004
HOLE DIAMETER:	63.5 (HQ)
DRILLING METHOD:	Diamond core

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
NS 1900-0700	C Lee	12/02/2004		12	12	0	move and setup	0	0	0.00	0	0	0	0.00
DS 0700-1900	R Bowden	13/2/2004		12	8	9.50	repaired stove, wrestled with binding casin	9.5	4	2.38	12	8	4	2.38
NS 1900-0700	C Lee	13/2/2004		12	0.5	26.60	slow drilling due to wrong bit	17.1	11.5	1.49	24	8.5	15.5	1.72
DS 0700-1900	R Bowden	02/14/2004		12	9	31.60	reflex, thermistor, packed and moved to D	5	3	1.67	36	17.5	18.5	1.71

OVERALL HOLE DRILL RATE (m/hr)	0.66
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	1.71

GEOTECH LOGGING 1 - INPUT (GENERAL GEOTECH LOG)

DRILLHOLE ID: **MPV-04-134c**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
0.00	1.60	1.60	Ice							
1.60	8.20	6.60	OB							sand (inferred), gravel, cobble and boulders fragments; many mineralogies
8.20	8.60	0.40	PGN	0.40	100.0	0.40	100.0	0.36	90.0	PGN = gneissic granite/foliated paragneiss
8.60	11.60	3.00	PGN	3.00	100.0	3.00	100.0	2.30	76.7	DRILLING PARALLEL TO FOLIATION; core splits on foln during drilling, promotes additional mechanical breakage; fudged RQD
11.60	14.60	3.00	PGN/GR	3.00	100.0	2.90	96.7	2.30	76.7	2 rubbley zones attributed to breakage associated with core parallel joints; fudged RQD
14.60	17.60	3.00	GR	2.97	99.0	2.89	96.3	2.76	92.0	disseminated sulphides ~3% @ 17.3m
17.60	20.60	3.00	PGN	2.94	98.0	2.89	96.3	2.89	96.3	
20.60	23.60	3.00	PGN	3.00	100.0	2.87	95.7	2.79	93.0	
23.60	26.60	3.00	PGN	3.00	100.0	2.95	98.3	2.95	98.3	
26.60	27.90	1.30	PGN	1.30	100.0	1.17	90.0	1.09	83.8	
27.90	29.60	1.70	PGN	1.70	100.0	1.70	100.0	1.70	100.0	
29.60	31.60	2.00	PGN	2.00	100.0	1.93	96.5	1.93	96.5	**END OF HOLE**

GEOTECHNICAL LOGGING 2 - INPUT (DETAILED LOG)

DRILLHOLE ID:

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

FROM	TO	ROCK	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of			JOINT CONDITIONS				COMMENT
(m)	(m)	TYPE	STRONG R	WEAK R	% WEAK	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH	Sets	Type	Totals	ANGLE	ROUGH	ALT	FILL	
8.2	8.6	**GR**	R5		0	2	0	1	0	0	0	0	1	J1	1	50	4	0	9	
8.6	9.1	**GR**	R5		0	5	0	0	0	0	0	0								
9.1	9.5	**GR**	R5		0	2	0	1	0	0	0	0	1	J1	1	20	7	0	9	
9.5	11.6	**PGN**	R3		0	49	0	3	0	0	0	0	3	J1	1	63	5	0	3	High open fracture count due to core splitting on foliation planes, and related mechanical breakage
														J2	1	39	4	0	9	
														J3	1	15	2	0	9	
11.6	13.8	**PGN**	R3		0	32	0	4	0	0	1	0	2	J1	2	0	8	0	5	Low angle/core parallel joints cause multiple breaks during drilling; chlorite fill
														J2	2	35	2	0	5	chlorite fill
13.8	14.6	**GR**	R5		0	8	0	4	0	0	1	0	2	J1	2	0	8	0	5	same core parallel joints, but more competent granite; chlorite fill
														J2	2	70	4	0	3	calcite fill
14.6	17.0	**GR**	R5		0	17	0	5	1	0	1	0	2	J1	2	10	5	0	5	
														J2	3	60	7	0	3	
																				1 qtz (vein) cemented joint - strong
17.0	18.5	**PGN**	R3		0	12	0	4	0	0	0	0	2	J1	2	20	5	0	6	
														J2	2	75	7	0	2	
18.5	20.9	**PGN**	R3		0	24	0	7	0	0	1	0	2	J1	3	15	5	0	6	chlorite fill
														J2	4	70	4	0	3	calcite fill
20.9	23.6	**PGN**	R3		0	33	0	8	0	0	1	0	3	J1	4	30	5	0	6	chlorite fill
														J2	3	40	7	0	3	calcite fill
														J3	1	70	8	0	6	chlorite fill
23.6	26.6	**PGN**	R3		0	20	0	5	0	0	1	0	3	J1	1	20	8	0	9	
														J2	3		4	0	9	
														J3	1	30	4	0	9	
26.6	27.9	**PGN**	R3		0	15	0	3	0	0	1	0	3	J1	1	20	4	0	9	
														J2	1	35	4	0	9	
														J3	1	65	2	0	9	
27.9	29.6	**PGN**	R3		0	4	0	2	0	0	0	0	1	J1	2	20	5	0	9	
29.6	31.6	**PGN**	R3		0	8	0	4	0	0	0	0	3	J1	2	83	4	0	3	J1 has calcite coating
														J2	1	23	4	0	9	
														J3	1	60	2	0	9	**END OF HOLE**

FIELD GEOLOGICAL LOG

HOLE ID MPV-04-134c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	1.60	Ice/Snow	n/a	Ice/snow	RB/CLee
1.60	8.20	Overburden	n/a	Overburden: sand (inferred), gravel, cobble and boulders fragments; many mineralogies	RB/CLee
8.20	16.00	Gneissic granite	n/a	gneissic granite/foliated paragneiss	RB/CLee
16.00	17.60	Granite	n/a	Granite; disseminated sulphides ~3% @ 17.3m	RB/CLee
17.60	31.60	Gneissic granite	n/a	gneissic granite/foliated paragneiss	RB/CLee
EOH					

SRK Photo Log Sheet

Drillhole ID: **MPV-04-134c**

Shift	Camera Photo Number	Filename	Depth	Description
DS 0700-1900		MPV-04-134c-1.6m-Box1-DRY	1.6 - 8.2m	sample of overburden materials
NS 1900-0700		MPV-04-134c-8.2m-Box2-DRY	8.2 - 10.77m	splitting on foliation, 49 fractures, but only 3 real joints
NS 1900-0700		MPV-04-134c-10.77m-Box3-DRY	10.77 - 13.20 m	
NS 1900-0700		MPV-04-134c-13.20m-Box4-DRY	13.20 - 15.77 m	contact between PGN and GR
NS 1900-0700		MPV-04-134c-15.77m-Box5-DRY	15.77 - 18.49 m	disseminated sulphides: ~3% @ 17.3
NS 1900-0700		MPV-04-134c-18.49m-Box6-DRY	18.49 - 20.94 m	
NS 1900-0700		MPV-04-134c-20.94m-Box7-DRY	20.94 - 23.60 m	
DS 0700-1900		MPV-04-134c-23.6m-Box8-DRY	23.6 - 26.6m	
DS 0700-1900		MPV-04-134c-26.6m-Box9-DRY	26.6 - 29.0m	
DS 0700-1900		MPV-04-134c-29.0m-Box10-DRY	29.0 - 31.6m	**END OF HOLE**

Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-134c	1	1.60	8.20
MPV-04-134c	2	8.20	10.77
MPV-04-134c	3	10.77	13.20
MPV-04-134c	4	13.20	15.77
MPV-04-134c	5	15.77	18.49
MPV-04-134c	6	18.49	20.94
MPV-04-134c	7	20.94	23.60
MPV-04-134c	8	23.60	26.60
MPV-04-134c	9	26.60	29.00
MPV-04-134c	10	29.00	31.60
		31.60	**END OF HOLE**

Borehole ID		MPV-04-134c
Thermistor String ID		16/32 - 8
Ice Bath Readings		
Thermistor	Reading	
	(kOhms)	Comments
1	16.25	
2	16.32	
3	16.28	
4	16.37	
5	16.35	
6	16.34	
7	16.36	
8	16.32	
9	16.37	
10	16.31	
11	16.29	
12	16.32	
13	16.31	
14	16.31	
15	16.37	
16	16.37	

Reflex Readings **MPV-04-134C**

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N	Magnetic Field	Temp ©
14-Feb-04	31.6	292.5	67.9	254	5945	11.6

POINT LOAD TEST - INPUT

DRILL HOLE ID: MPV-04-134C

No. #	TESTED BY	DATE	HOLE/ FACE ID	DIST. (m)	ROCK TYPE	TEST TYPE	ORINT	DAYS	W (mm)	D (mm)	P (kN)	COMMENT
1	John Delgaty	###########	MPV-04-134C	29.35	Granite Gneiss	1				63.40	33.79	Fine grained black/pink granite gneiss - chipped
2	John Delgaty	###########	MPV-04-134C	to	Granite Gneiss	1				63.40	27.13	Fine grained black/pink granite gneiss - clean break
3	John Delgaty	###########	MPV-04-134C		Granite Gneiss	1				63.40	29.82	Fine grained black/pink granite gneiss - oblique break
4	John Delgaty	###########	MPV-04-134C	30.07	Granite Gneiss	1				63.40	30.61	Fine grained black/pink granite gneiss - chipped
1	John Delgaty	###########	MPV-04-134C	30.29	Granite Gneiss	1				63.40	10.92	Fine grained black/pink granite gneiss - chipped
2	John Delgaty	###########	MPV-04-134C	30.36	Granite Gneiss	1				63.40	20.39	Fine grained black/pink granite gneiss - clean break

UCS SAMPLES

HOLE ID: MPV-04-134C

HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-134C	10	30.07	Granite	04-UCS-134-001

GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH

	CATEGORY	DESCRIPTION	Mpa
R0	EXTREMELY WEAK ROCK	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	VERY WEAK ROCK	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	WEAK ROCK	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	MEDIUM STRONG ROCK	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	STRONG ROCK	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	VERY STRONG ROCK	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	EXTREMELY STRONG ROCK	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY

CODE	DESCRIPTION
0	NONE
1	MINOR
2	MODERATE
3	HEAVY

DROP TEST - CEMENTED JOINTS/DEFECTS

CODE	CATEGORY
0	STRONG (NEVER BREAKS)
1	MODERATE (SOMETIMES BREAKS)
3	WEAK (ALWAYS BREAKS)

JOINT CONDITION - SMALL SCALE

CODE	CATEGORY	SUBCATEGORY
1	STEPPED	ROUGH
2		SMOOTH
3		SLICKENSIDED
4	UNDULATING	ROUGH
5		SMOOTH
6		SLICKENSIDED
7	PLANAR	ROUGH
8		SMOOTH
9		SLICKENSIDED

JOINT FILLING

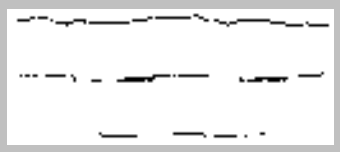
CODE	CATEGORY	SUBCATEGORY
1	NON	COARSE
2	SOFTENING	MEDIUM
3		FINE
4	SOFT	COARSE
5	SHEARED	MEDIUM
6		FINE
7	GOUGE THIKNESS < IRREGULARITIES	
8	GOUGE THIKNESS > IRREGULARITIES	
9	NO INFILL	

JOINT ALTERATION

CODE	DESCRIPTION
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

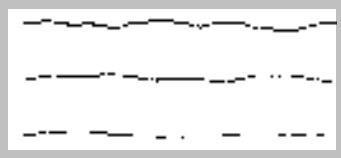
JOINT CONDITIONS - SMALL SCALE

	Laubscher	Jr	JRC
ROUGH	1	4	20
SMOOTH	2	3	14
SLICKEN-SIDED	3	2	11



STEPPED

ROUGH	4	3	14
SMOOTH	5	2	11
SLICKEN-SIDED	6	1.5	7

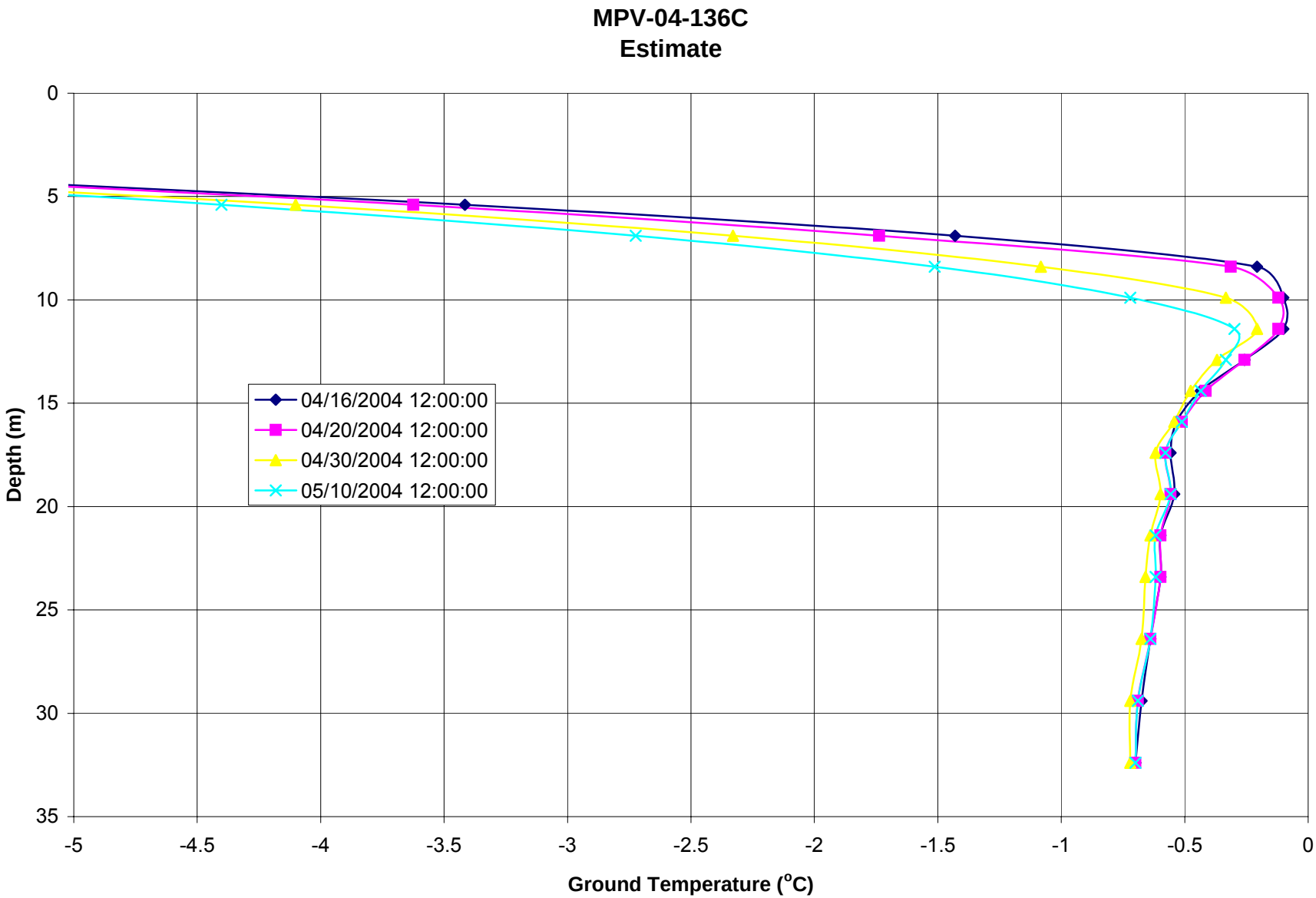


UNDULATING

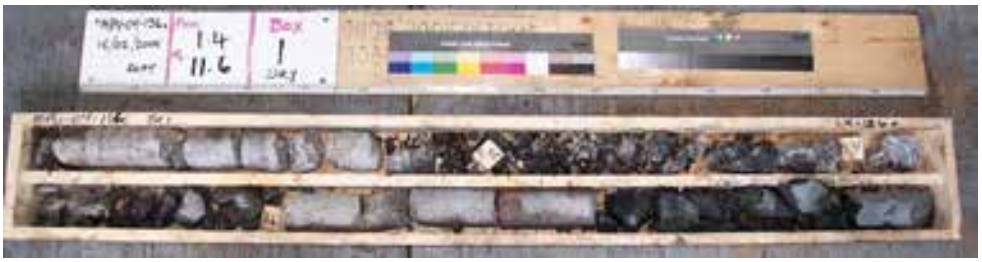
ROUGH	7	1.5	2.5
SMOOTH	8	2	1.5
SLICKEN-SIDED	9	0.5	0.5

PLANAR

SRK STEFFEN, ROBERTSON AND KIRSTEN
Consulting Engineers


MPV-04-136C
Estimate
Depth (m)
0
5
10
15
20
25
30
35
-5
-4.5
-4
-3.5
-3
-2.5
-2
-1.5
-1
-0.5
0
Ground Temperature (°C)
04/16/2004 12:00:00
04/20/2004 12:00:00
04/30/2004 12:00:00
05/10/2004 12:00:00

MPV_04_136C


1.4
11.6
Box
1
DRY


12.6
15.6
Box
2
DRY


15.6
18.1
Box
3
DRY


18.1
20.6
Box
4
DRY


20.6
23.0
Box
5
DRY

MPV_04_136C

DS 13/02/2004

1400hrs	re-established location by measuring 20.5m from D4-A-1T, along axis of dyke

NS 14/02/2004

1900hrs	Fix drill floor, lay and bury hose, set casing at 5.3m (reamed in, stopped drill)
0130hrs	Begin drilling
	Pulled out pebbles from core barrel at 8.5m; not yet in bedrock
0230hrs	Decision to re-set casing; pull rods, no core barrel clamp
	Casing not sinking, decide pull all sections to replace shoe, use rods to keep hole open
	Rods stuck inside casing, pull out rods
	Ended shift with three 1.5m sections of casing left to pull
	N.B. Bedrock not encountered at 8.5m!

DS 15/02/2004

0700hrs	pulled remaining casing; changed shoe; old shoe had been seriously burned
	re-set casing to 12.1m, in bedrock
1100hrs	maintenance on rig engine and core shack generator
1300hrs	started drilling
1400hrs	14.6m
1600hrs	19.9m
1730hrs	23.6m
1930hrs	26.6m

NS 15/02/2004

1900hrs	continued drilling
2230hrs	finished hole at 32.4m
0030hrs	reflex, thermistor calibration and installation, pull rods
0130hrs	fished sub out of mud; pull casing
	set thermistor protective casing
	Mobilize to D4-A-3T (Drill pad for D4-A-4T too small, requires expansion)

SRK Consulting
Engineers and Scientists

FIELD DRILL PERFORMANCE LOG

PROJECT:	**Gahcho Kue Geotech**
PROJECT NO:	**2CD002.11**
NORTHING:	7035637.17
EASTING:	589313.81
SURFACE ELEVATION:	404.26
AZIMUTH:	130
DIP:	70

HOLE NO:	**MPV-04-136C**
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	0130 hrs 14 Feb 2004
DATE AND TIME FINISHED:	2230 hrs 15 Feb 2004
HOLE DIAMETER:	63.5 (HQ)
DRILLING METHOD:	Diamond core

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
NS 1900-0700	C Lee	14/2/2004	0700hrs	12	12		finish mob (lay and bury hose), fix drill floor, casing problems - not completed	0	0	0.00	0	0	0	0.00
DS 0700-1900	R Bowden	14/2/2004	1830hrs	12	5.5	26.60	changed casing shoe, drilled casing lower	26.6	6.5	4.09	12	5.5	6.5	4.09
NS 1900-0700	C Lee	15/2/2004	1900hrs	12	8.5	32.40	reflex, thermistor installation, mob	5.8	3.5	1.66	24	14	10	3.24

OVERALL HOLE DRILL RATE (m/hr)	0.90
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	3.24

GEOTECH LOGGING 1 - INPUT (GENERAL GEOTECH LOG)

DRILLHOLE ID: **MPV-04-136C**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
0.00	1.40	1.40	Snow/Ice							
1.40	11.60	10.20	OB							granite boulders, gravel, dog's breakfast
11.60	14.60	3.00	GGR	3.00	100.0	1.90	63.3	1.12	37.3	GGR = gneissic granite
14.60	16.90	2.30	GGR	2.30	100.0	1.90	82.6	1.65	71.7	
16.90	19.90	3.00	GGR	3.00	100.0	2.30	76.7	2.10	70.0	
19.90	20.60	0.70	GGR	0.70	100.0	0.50	71.4	0.50	71.4	
20.60	23.60	3.00	GGR	3.00	100.0	2.30	76.7	1.95	65.0	
23.60	26.60	3.00	GGR	3.00	100.0	2.85	95.0	2.85	95.0	
26.60	29.60	3.00	MGN	2.97	99.0	2.89	96.3	2.30	76.7	MGN = mafic gneiss
29.60	**32.40**	2.80	MGN	2.75	98.2	2.28	81.4	1.50	53.6	**END OF HOLE**
		0.00								
		0.00								
		0.00								
		0.00								
		0.00								
		0.00								
		0.00								
		0.00								
		0.00								
		0.00								
		0.00								
		0.00								
		0.00								
		0.00								
		0.00								

GEOTECHNICAL LOGGING 2 - INPUT (DETAILED LOG)

DRILLHOLE ID: **MPV-04-136C**

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

FROM	TO	ROCK	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of			JOINT CONDITIONS				COMMENT
(m)	(m)	TYPE	STRONG R	WEAK R	% WEAK	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH	Sets	Type	Totals	ANGLE	ROUGH	ALT	FILL	
11.6	14.6	**GGR**	R5		0	30	0	16	0	0	1	0	2	J1	12		5	0	3	
														J2	4		4	0	3	
																				almost all joints have hard, fine crystaline yellow coating up to 2m
14.6	16.9	**GGR**	R5		0	18	0	11	0	0	1	0	2	J1	7	50	1	0	3	
														J2	4	20	7	0	3	
																				half of J1 have fine crystaline coating up to 2mr
16.9	19.9	**GGR**	R5		0	30	0	16	2	0	1	0	2	J1	7		2	0	3	
														J2	9		1	0	3	
																				no consistent joint angle; joints at 15, 20, 25, 30, 45, 60, 70; most are coated with calcite to 2mm
19.9	20.6	**GGR**	R5		0	10	0	8	0	0	0	0	2	J1	5		8	0	3	
														J2	3		4	0	9	
																				J1 angles 50-6(
20.6	23.6	**GGR**	R5		0	30	0	17	0	0	1	0	3	J1	13	50	5	0	3	
														J2	2	90	5	0	3	
														J3	2		4	0	9	most J1 and J2 are joints are coated with calcite up to 2mr
23.6	26.6	**GGR**	R5		0	16	0	16	4	0	0	0	1	J1	16		1	0	3	
																				all joints coated with clacite to 2mm
26.6	28.0	**MGN**	R4		0	26	0	9	10	1	1	1	3	J1	2	0	5	0	3	
														J2	5	65	2	0	3	
														J3	2	30	5	0	5	calcite + chlorite coated joints
28.0	29.6	**MGN**	R4		0	14	0	7	1	2	2	1	3	J1	3	42	4	0	3	
														J2	3	30	7	0	3	
														J3	1	80	7	0	3	
29.6	29.8	**MGN**	R4		100	100	0	100	0	0	3	2								RUBBLE ZONE
29.8	32.4	**MGN**	R4		0	21	0	14	4	2	2	1	3	J1	11	60	5	0	3	
														J2	2	25	2	0	3	
														J3	1	70	4	0	1	**END OF HOLE**

SRK Photo Log Sheet

MPV-04-136C

Shift	Filename	Depth	Description
DS 0700-1900	MPV-04-136c_1.4m_Box1_Dry	1.4 - 12.6m	
DS 0700-1900	MPV-04-136c-12.6m-Box2-dry	12.6 - 15.6m	
DS 0700-1900	MPV-04-136c-15.6m-Box3-dry	15.6 - 18.1m	
DS 0700-1900	MPV-04-136c-18.1m-Box4-dry	18.1 - 20.6m	
DS 0700-1900	MPV-04-136c-20.m-Box5-dry	20.6 - 23.0m	
DS 0700-1900	MPV-04-136c-23.m-Box6-dry	23.0 - 26.0m	
NS 1900-0700	MPV-04-136c-26.0m-Box7-dry	26.0 - 28.02m	
NS 1900-0700	MPV-04-136c-28.02m-Box8-dry	28.02 - 29.73m	
NS 1900-0700	MPV-04-136c-29.73m-Box9-dry	29.73 - 32.40m	**END OF HOLE**

Cores Box Record

MPV-04-136C

Box	From	To	
1	1.40	12.60	
2	12.60	15.60	
3	15.60	18.10	
4	18.10	20.60	
5	20.60	23.00	
6	23.00	26.00	
7	26.00	28.02	
8	28.02	29.73	
9	29.73	**32.40**	**EOH**
10			
11			
12			

Reflex Readings **MPV-04-136C**

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N	Magnetic Fielc	Temp ©
Feb 15 2004	32.4	284.3	67.4	40.4	5942	15.3

FIELD GEOLOGICAL LOG

HOLE ID MPV-04-136c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	1.40	Ice/Snow	n/a	Ice/snow	RB/Clee
1.40	11.60	Overburden	n/a	Overburden: Cobbles and boulders of various lithologies	RB/CLee
11.60	26.60	Gneissic granite	n/a	Gneissic granite	RB/CLee
26.60	32.40	Mafic gneiss	n/a	Mafic gneiss	RB/Clee
EOH					

UCS SAMPLES

HOLE ID: MPV-04-136C

HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-136C	3	20.66	Amphibole	04-UCS-136-001

POINT LOAD TEST - INPUT

DRILL HOLE ID: **MPV-04-136C**

No. #	TESTED BY	DATE	HOLE/ FACE ID	DIST. (m)	ROCK TYPE	TEST TYPE	ORINT	DAYS	W (mm)	D (mm)	P (PSI)	COMMENT	
	BAM	04/07/2004	MPV-04-136C	17.50	DIABASE	1	LEFT			65.10	3700.00	GOOD BREAK	
	BAM	04/07/2004	MPV-04-136C	17.50	DIABASE	1	LEFT			65.10	3450.00	GOOD BREAK	
	BAM	04/07/2004	MPV-04-136C	17.50	DIABASE	1	LEFT			65.10		FAILED ON DEFECT	
	BAM	04/07/2004	MPV-04-136C	17.90	DIABASE	1	RIGHT			65.10	3550.00	FAIR BREAK	ANGLED
	BAM	04/07/2004	MPV-04-136C	17.90	DIABASE	1	RIGHT			65.10		NO MORE SAMPLE ON RIGHT	

Thermistor Readings **MPV-04-136C**

Thermistor String ID **32/16-11**

Ice Bath Readings		
Thermistor	Reading	
	(kOhms)	Comments
1	14.53	
2	14.16	
3	13.75	
4	14.50	
5	14.21	
6	14.27	
7	14.59	
8	14.49	
9	14.28	
10	14.98	
11	14.37	
12	14.06	
13	14.20	
14	14.05	
15	14.26	
16	15.13	

GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH

	CATEGORY	DESCRIPTION	Mpa
R0	EXTREMELY WEAK ROCK	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	VERY WEAK ROCK	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	WEAK ROCK	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	MEDIUM STRONG ROCK	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	STRONG ROCK	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	VERY STRONG ROCK	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	EXTREMELY STRONG ROCK	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY

CODE	DESCRIPTION
0	NONE
1	MINOR
2	MODERATE
3	HEAVY

DROP TEST - CEMENTED JOINTS/DEFECTS

CODE	CATEGORY
0	STRONG (NEVER BREAKS)
1	MODERATE (SOMETIMES BREAKS)
3	WEAK (ALWAYS BREAKS)

JOINT CONDITION - SMALL SCALE

CODE	CATEGORY	SUBCATEGORY
1	STEPPED	ROUGH
2		SMOOTH
3		SLICKENSIDED
4	UNDULATING	ROUGH
5		SMOOTH
6		SLICKENSIDED
7	PLANAR	ROUGH
8		SMOOTH
9		SLICKENSIDED

JOINT FILLING

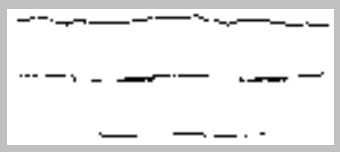
CODE	CATEGORY	SUBCATEGORY
1	NON	COARSE
2	SOFTENING	MEDIUM
3		FINE
4	SOFT	COARSE
5	SHEARED	MEDIUM
6		FINE
7	GOUGE THIKNESS < IRREGULARITIES	
8	GOUGE THIKNESS > IRREGULARITIES	
9	NO INFILL	

JOINT ALTERATION

CODE	DESCRIPTION
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

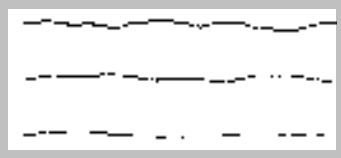
JOINT CONDITIONS - SMALL SCALE

	Laubscher	Jr	JRC
ROUGH	1	4	20
SMOOTH	2	3	14
SLICKEN-SIDED	3	2	11



STEPPED

ROUGH	4	3	14
SMOOTH	5	2	11
SLICKEN-SIDED	6	1.5	7



UNDULATING

ROUGH	7	1.5	2.5
SMOOTH	8	2	1.5
SLICKEN-SIDED	9	0.5	0.5

PLANAR

SRK STEFFEN, ROBERTSON AND KIRSTEN
Consulting Engineers

MPV_04_138C


1.40
8.90
Box
1
Dry


8.9
11.8
Box
2
dry


11.8
14.6
Box
3
dry


14.6
17.6
Box
4
dry


Box
5

MPV_04_138C

Diary

MPV-04-138c

DS 16/02/2004

0700hrs	laying hoses etc.
1030hrs	began to sink casing
1400hrs	casing set to 7.3m depth
	ground surface at 1.5m (est.) below rig floor
	started to drill
1430hrs	calibrated 32/16-10
1500hrs	8.6m - granite - hard drilling
1630hrs	11.6m
1730hrs	14.6m
1830hrs	17.6m

NS 16/02/2004

2130hrs	20.6m
	change bit at 20.6m depth as bit #2 is not adequate for very hard granite and wore down fast
2230hrs	continue drilling
	23.6m
0030hrs	problems with moving casing
0200hrs	casing started to move, drilled to 25.8m, started to pull rods to ream the hole
0320hrs	add some more casing to orginal depth of casing
0400hrs	finished putting casing back into hole, start lowering rods
0530hrs	start coring till end of shift

DS 17/02/2004

0840hrs	29.6m
0900hrs	31.6m
	waited for reflex
	thermistor installed
	protective pipe installed
	staked
1200hrs	pulling casing

SRK Consulting
Engineers and Scientists

FIELD DRILL PERFORMANCE LOG

PROJECT	**Gahcho Kue Geotech**
PROJECT NO	**2CD002.11**
NORTHING	7035684.68
EASTING	589250.83
SURFACE ELEVATION	404.47
AZIMUTH	130
DIP	-70

HOLE NO:	**MPV-04-138c**
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	1200 16/02/2004
FINISH DATE AND TIME	1000 17/02/2004
HOLE DIAMETER	63.5 (HQ)
DRILLING METHOD	Diamond core

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
DS 0700-1900	R Bowden	16/02/2004		12	5	17.6	set-up, casing, etc.	17.6	7	2.51	12	5	7	2.51
NS 1900-0700	B Rameseder	16/02/2004		12	6	26.60	bit change at 20.6m, reset casing, ream ho	26.6	6	1.50	24	11	13	2.05
DS 0700-1900	R Bowden	17/02/2004		12	10	31.60	reflex, thermistor, packed and moved	5	2	2.50	36	21	15	2.11

OVERALL HOLE DRILL RATE (m/hr)	1.37
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	3.28

GENERAL GEOTECH LOG

DRILLHOLE ID: **MPV-04-138c**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
0.00	1.50	1.50	Snow/Ice							
1.50	6.80	5.30	OB							sands and gravels (inferred). Cobbles and boulders of various mineralogies
6.80	8.60	1.80	GR	1.80	100.0	1.80	100.0	1.80	100.0	
8.60	11.60	3.00	GR	3.00	100.0	3.00	100.0	3.00	100.0	very solid
11.60	14.60	3.00	GR	3.00	100.0	3.00	100.0	3.00	100.0	
14.60	17.60	3.00	GR	3.00	100.0	3.00	100.0	3.00	100.0	
17.60	20.60	3.00	GR	2.95	98.3	2.95	98.3	2.95	98.3	
20.60	23.60	3.00	GR	2.98	99.3	2.88	96.0	2.81	93.7	
23.60	25.80	2.20	GR	2.23	101.4	2.21	100.5	2.21	100.5	
25.80	26.60	0.80	GR	0.80	100.0	0.80	100.0	0.80	100.0	
26.60	29.60	3.00	GR	3.00	100.0	3.00	100.0	3.00	100.0	
29.60	31.60	2.00	GR	2.00	100.0	2.00	100.0	2.00	100.0	**END OF HOLE**
		0.00								

DETAILED GEOTECHNICAL LOG

DRILLHOLE ID:

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

FROM	TO	ROCK	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of			JOINT CONDITIONS				COMMENT
(m)	(m)	TYPE	STRONG R	WEAK R	% WEAK	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH	Sets	Type	Totals	ANGLE	ROUGH	ALT	FILL	
6.8	8.6	GR	R6		100	10	0	0	0	0	0	0	1		0					interpret all fractures to be machine break
8.6	11.6	GR	R6		100	7	0	3	0	0	0	0	3	J1	1	60	7	0	9	
														J2	1	40	4	0	9	
														J3	1	50	4	0	9	
11.6	14.6	GR	R6		100	6	0	4	0	0	0	0	1	J1	4	65	4	0	9	
14.6	17.6	GR	R6		100	6	0	0	0	0	0	0	1							interpret all fractures to be machine break
17.6	20.6	GR	R6		100	15	0	4	0	0	0	0	2	J1	2	35	2	0	9	
														J2	2	57	4	0	9	mainly machine breaks
20.6	23.6	GR	R6		100	13	0	7	0	0	0	0	3	J1	2	63	7	0	3	
														J2	1	90	7	0	3	
														J3	4	53	5	0	9	
23.6	25.8	GR	R6		100	4	0	4	0	0	0	0	1	J1	4	45	5	0	2	some pyrite coating on some joints
25.8	26.6	GR	R6		100	1	0	0	0	0	0	0	1							no natural breaks in this short run en
26.6	29.6	GR	R6		100	7	0	1	0	0	0	0	1	J1	1	45	1	0	9	
29.6	31.6	GR	R6		100	3	0	1	0	0	1	0	1	J1	1	10	1	0	9	END OF HOLE

Photo Record

MPV-04-138c

Date	Shift	Filename	Depth	Description
16/02/2004	DS 0700-1900	MPV-04-138c-1.4m-Box1-dry	1.4 - 8.90m	OB and granite
16/02/2004	DS 0700-1900	MPV-04-138c-8.9m-Box2-wet	8.90 - 11.80m	GR
16/02/2004	DS 0700-1900	MPV-04-138c-11.8m-Box3-dry	11.80 - 14.60m	GR
16/02/2004	DS 0700-1900	MPV-04-138c-14.6m-Box4-dry	14.60 - 17.60m	GR
16/02/2005	NS 1900-0700	MPV-04-138c-17.6m-Box5-dry	17.60 - 20.60m	GR
16/02/2006	NS 1900-0700	MPV-04-138c-20.6m-Box6-dry	20.60 - 23.60m	GR
16/02/2007	NS 1900-0700	MPV-04-138c-23.6m-Box7-dry	23.60 - 26.40m	GR biotite rich, gneissic
17/02/2004	DS 0700-1900	MPV-04-138c-26.4m-Box8-dry	26.40 - 29.2m	GR
17/02/2004	DS 0700-1900	MPV-04-138c-26.4m-Box9-dry	29.2 - 31.6M	**END OF HOLE**

Core Box Record

MPV-04-138c

Box	From	To	Comments
1	1.40	8.90	OVB and granite
2	8.90	11.80	granite
3	11.80	14.60	granite
4	14.60	17.60	granite
5	17.60	20.60	granite
6	20.60	23.60	granite
7	23.60	26.40	granite
8	26.40	29.20	granite
9	29.20	31.60	**END OF HOLE**

Reflex Readings **MPV-04-138C**

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N	Magnetic Field	Temp ©
17-Feb-04	31.6	117.1	69.1	344.3	5906	11.1

Thermistor Readings

MPV-04-138c

Tested in ice water bath

Thermistor String ID **32/16-10**

Thermis Node	Reading (kOhms)	Comments
1	16.33	
2	16.31	
3	16.31	
4	16.32	
5	16.32	
6	16.31	
7	16.34	
8	16.30	
9	16.29	
10	16.32	
11	16.30	
12	16.30	
13	16.28	
14	16.32	
15	16.33	
16	16.29	

FIELD GEOLOGICAL LOG

HOLE ID MPV-04-138c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	1.50	Ice/Snow	n/a	Ice/snow	RB/BR
1.50	8.60	Overburden	n/a	sands and gravels (inferred). Cobbles and boulders of various lithologies	RB/BR
8.60	31.60	Granite	n/a	Granite, fresh compact granite, pink, dark-grey, coarse grained	RB/BR
EOH					

POINT LOAD TEST - INPUT

DRILL HOLE ID: MPV-04-138C

No. #	Tested by	DATE	HOLE/ FACE ID	DIST. (m)	ROCK TYPE	TEST TYPE	ORINT	DAYS	W (mm)	D (mm)	P (kN)	COMMENT
1	SM	02/17/2004	MPV-04-138C	30	GRANITE	1		0.5		63	32.79	SOMEWHAT DIAGONALBREAK
2	SM	02/17/2004	MPV-04-138C		GRANITE	1		0.5		63	41.4	BROKE ALONG 3 AXIS
3	SM	02/17/2004	MPV-04-138C		GRANITE	1		0.5		63	23.83	SOMEWHAT CURVED BREAK
1	SM	02/17/2004	MPV-04-138C		GRANITE	1		0.5		63	39.46	SLIGHTLY DIAGONALBREAK
2	SM	02/17/2004	MPV-04-138C		GRANITE	1		0.5		63	42.45	TRIAXIAL BREAK
3	SM	02/17/2004	MPV-04-138C		GRANITE	1		0.5		63	21.37	STEPPED BREAK

UCS SAMPLES

HOLE ID: MPV-04-138C

HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-138C	9	29.80	GRANITE	04-UCS-138-001

MPV_04_140C


17-02-04
Box
1
Dry


17-02-04
Box
2
Dry


17-02-04
Box
3
Dry


17-02-04
Box
4
Dry


17-02-04
Box
5
Dry

MPV_04_140C


19.00m
21.65
Box
6
Dry


21.65
24.45
Box
7
Dry


24.45
27.30
Box
8
Dry


27.3
30.2
Box
9
Dry


30.2
31.6
Box
10
Dry

Diary

MPV-04-140c

DS 17/02/2004

1500hrs	moved onto hole

NS 17/02/2004

1900hrs	start casing
0000hrs	start coring, HQ3 bit is used as no more HQ bits in camp
0200hrs	first run in bedrock to 8.6m finished
0300hrs	core to 11.6m
0400hrs	problems with a bolt to pull out core barrel (0.5hrs)
0430hrs	core to 14.6m
0510hrs	core to 17.6m
0610hrs	core to 20.6m

DS 18/02/2004

0800hrs	at 23.6m
0845hrs	at 26.6m
0945hrs	at 29.6m
1010hrs	at 31.6m END OF HOLE
	flex
1130hrs	thermistor installed
	protective pipe installed
	staked

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FIELD DRILL PERFORMANCE LOG

PROJECT	**Gahcho Kue Geotech**
PROJECT NO	**2CD002.11**
NORTHING	7035694.9
EASTING	589235.1
SURFACE ELEVATION	406.21
AZIMUTH	310
DIP	70

HOLE NO:	**MPV-04-140c**
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	1900hrs 17/02/2004
FINISH DATE AND TIME	1130hrs 18/02/2004
HOLE DIAMETER	63.5 (HQ3) - see diary
DRILLING METHOD	Diamond core

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
DS 0700-1900	R Bowden	17/02/2004					end MPV-04-138C, move, set-up	0	0	0.00	0	0	0	0.00
NS 1900-0700	B Rameseder	17/02/2004	1900	12	0.5	20.60	started casing, clean hole when putting in	20.6	11.5	1.79	12	0.5	11.5	1.79
DS 0700-1900	R Bowden	18/02/2004	0700	12	8.5	31.60	finished drilling at 1030; reflex and thermis	11	3.5	3.14	24	9	15	2.11

OVERALL HOLE DRILL RATE (m/hr)	1.32
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	2.11

GENERAL GEOTECH LOG

DRILLHOLE ID: **MPV-04-140c**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
0.00	*1.40*	*1.40*	Snow/Ice							depth to ground surface 1.5m (estimated). OVB=overburden; pieces of granite
1.40	8.60	7.20	OVB	2.85	39.6	2.83	39.3	2.83	39.3	granite, fresh compact granite, pink, dark-grey, coarse grained
5.60	8.60	3.00	GRN	2.85	95.0	2.83	94.3	2.83	94.3	granite, fresh compact granite, pink, dark-grey, coarse grained
8.60	11.60	3.00	GRN	2.95	98.3	2.95	98.3	2.95	98.3	
11.60	14.60	3.00	GRN	2.88	96.0	2.85	95.0	2.85	95.0	mica in granite seems sometimes orientated; at 14.3m 2cm wide stringer of m
14.60	17.60	3.00	GRN	3.02	100.7	2.96	98.7	2.80	93.3	
17.60	20.60	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
20.60	23.60	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
23.60	26.60	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
26.60	29.60	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
29.60	31.60	2.00	GRN	2.00	100.0	2.00	100.0	2.00	100.0	**END OF HOLE**
		0.00								

DETAILED GEOTECHNICAL LOG

DRILLHOLE ID: MPV_04_140c

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

FROM (m)	TO (m)	ROCK TYPE	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of Sets	Type	Totals	JOINT CONDITIONS				COMMENT
			STRONG R	WEAK R	% WEAK	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH				ANGLE	ROUGH	ALT	FILL	
5.6	8.6	GRN	R5		0	12	0	5	0	0	0	0	3	J1	1	57	5	0	9	
														J2	1	80	5	0	3	
														J3	1	65	5	0	3	one set of joints with 1 joint at 45 ° angle; joint filling consists of pyr
8.6	11.6	GRN	R5		0	14	0	5	0	0	0	0	2	J1	3	55	5	0	9	
														J2	1	35	5	0	9	
														J3	1	70	2	0	2	joint 2 short interval of pegmatitic granit
11.6	14.6	GRN	R5		0	6	0	4	0	0	1	1	3	J1	1	60	5	0	3	
														J2	1	60	5	0	3	
														J3	1	55	5	0	9	I joint set with one joint at 33 ° angle, 2 rough, joint filling 3, sulphide
14.6	17.6	GRN	R5		0	12	0	7	0	0	0	0	3	J1	2	50	5	0	9	
														J2	4	55	7	0	9	
														J3	1	40	5	0	9	
17.6	20.6	GRN	R5		0	7	0	1	0	0	0	0	1	J1	1	40	1	0	9	
20.6	23.6	GRN	R5		0	11	0	2	0	0	0	0	2	J1	1	50	4	0	9	
														J2	1	70	5	0	9	
23.6	26.6	GRN	R5		0	8	0	1	0	0	0	0	1	J1	1	55	1	0	9	
26.6	29.6	GRN	R5		0	6	0	1	0	0	0	0	1	J1	1	55	1	0	9	
29.6	31.6	GRN	R5		0	4	0	0	0	0	0	0	0		0					
																				END OF HOLE

Photo Record

MPV-04-140c

Date	Shift	Filename	Depth	Description
17/02/04	NS 1900-0700	MPV-04-140c-0m-Box1-dry	0.0-7.14m	OVB, granite
17/02/04	NS 1900-0700	MPV-04-140c-7.14m-Box2-dry	7.14-10.13	granite
17/02/04	NS 1900-0700	MPV-04-140c-10.13m-Box3-dry	10.13-13.07	granite
17/02/04	NS 1900-0700	MPV-04-140c-13.07m-Box4-dry	13.07-16.07	granite
17/02/04	NS 1900-0700	MPV-04-140c-16.07m-Box5-dry	16.07-19.00	granite
18/02/2004	DS 0700-1900	MPV-04-140c-19.00m-Box6-dry	19.00 - 21.65m	granite
18/02/2004	DS 0700-1900	MPV-04-140c-21.65m-Box7-dry	21.65 - 24.45	granite
18/02/2004	DS 0700-1900	MPV-04-140c-24.45m-Box8-dry	24.45 - 27.30	granite
18/02/2004	DS 0700-1900	MPV-04-140c-27.3m-Box9-dry	27.3 - 30.2	granite
18/02/2004	DS 0700-1900	MPV-04-140c-30.2m-Box10-dry	30.2 - 31.6	**END OF HOLE**

Core Box Record

MPV-04-140c

Box	From	To	Comments
1	0.00	7.14	OVB, granite, fresh compact granite, pink, dark-grey, coarse grained
2	7.14	10.13	granite, short pegmatitic parts
3	10.13	13.07	granite, with intervals with more mafic minerals
4	13.07	16.07	mica in granite seems sometimes orientated; at 14.3m 2cm wide stringer of mafic intrusive igneous rock (dark grey, fine grained) abou 55° to core axis
5	16.07	19.00	granite
6	19.00	21.65	granite
7	21.65	24.45	granite
8	24.45	27.30	granite
9	27.30	30.20	granite
10	30.20	31.60	**END OF HOLE**
12			

Reflex Readings **MPV-04-140C**

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N	Magnetic Field	Temp ©
18-Feb-04	31.6	113.7	68.7	89.1	5938	10.3

Thermistor Readings

MPV-04-140c

Thermistor String ID **32/26 - 9**

Thermis Node	Reading (kOhms)	Comments
1	16.38	
2	16.36	
3	16.39	
4	16.39	
5	16.35	
6	16.35	
7	16.35	
8	16.35	
9	16.37	
10	16.38	
11	16.33	
12	16.36	
13	16.36	
14	16.36	
15	16.36	
16	16.41	

FIELD GEOLOGICAL LOG

HOLE ID MPV-04-140c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	1.40	Ice/Snow	n/a	Ice/snw	RB/BR
1.40	8.60	Overburden	n/a	Overburden; pieces of granite and granodiorite up to 40cm long	RB/BR
8.60	31.60	Granite	n/a	Granite, fresh compact granite, pink, dark-grey, coarse grained	RB/BR
EOH					

POINT LOAD TEST DATA **MPV-04-140c**

No. #	Tested by	DATE	HOLE/ FACE ID	DIST. (m)	ROCK TYPE	TEST TYPE	ORINT	DAYS	W (mm)	D (mm)	P (kN)	COMMENT

GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH

	CATEGORY	DESCRIPTION	Mpa
R0	EXTREMELY WEAK ROCK	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	VERY WEAK ROCK	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	WEAK ROCK	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	MEDIUM STRONG ROCK	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	STRONG ROCK	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	VERY STRONG ROCK	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	EXTREMELY STRONG ROCK	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY

CODE	DESCRIPTION
0	NONE
1	MINOR
2	MODERATE
3	HEAVY

DROP TEST - CEMENTED JOINTS/DEFECTS

CODE	CATEGORY
0	STRONG (NEVER BREAKS)
1	MODERATE (SOMETIMES BREAKS)
3	WEAK (ALWAYS BREAKS)

JOINT CONDITION - SMALL SCALE

CODE	CATEGORY	SUBCATEGORY
1	STEPPED	ROUGH
2		SMOOTH
3		SLICKENSIDED
4	UNDULATING	ROUGH
5		SMOOTH
6		SLICKENSIDED
7	PLANAR	ROUGH
8		SMOOTH
9		SLICKENSIDED

JOINT FILLING

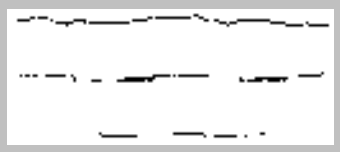
CODE	CATEGORY	SUBCATEGORY
1	NON	COARSE
2	SOFTENING	MEDIUM
3		FINE
4	SOFT	COARSE
5	SHEARED	MEDIUM
6		FINE
7	GOUGE THIKNESS < IRREGULARITIES	
8	GOUGE THIKNESS > IRREGULARITIES	
9	NO INFILL	

JOINT ALTERATION

CODE	DESCRIPTION
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

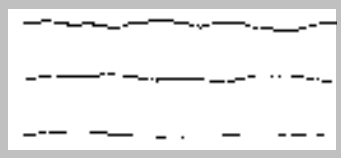
JOINT CONDITIONS - SMALL SCALE

	Laubscher	Jr	JRC
ROUGH	1	4	20
SMOOTH	2	3	14
SLICKEN-SIDED	3	2	11



STEPPED

ROUGH	4	3	14
SMOOTH	5	2	11
SLICKEN-SIDED	6	1.5	7



UNDULATING

ROUGH	7	1.5	2.5
SMOOTH	8	2	1.5
SLICKEN-SIDED	9	0.5	0.5

PLANAR

SRK STEFFEN, ROBERTSON AND KIRSTEN
Consulting Engineers

Diary

MPV-04-141c

DS 18/02/2004	
1800hrs	bottom of ice at 1.7m
	lake depth sounded, 3.5m
NS 18/02/2004	
2300hrs	about 5m deep of casing and coring (in turns)
2345hrs	7.8m deep "cored"
0230hrs	followed with casing to coring depth; technical problems after oil change; drill won't start, has to be boosted and fan belt of drill motor (diesel engine) broke and has to be changed
0330hrs	repairs completed and drill started up again
0400hrs	10.8m casing, coring sed
DS 19/02/2004	
0800hrs	at 11.3m; note depth is not usual 11.6 because run is impeded by 0.3m because of cuttings catcher
0910	at 14.3m; first packer test
1125	completed first packer test
1230	at 17.3m
1417	finished 2nd packer test
1700	finished 3rd packer test
1800	at 23.3m
NS 19/02/2004	
2000hrs	standby till about 20.00 because of phone conference in the office with Marty Podolsky
2015hrs	start packer installation, some problems to bring packer down hole as the packer is slightly bended
2059hrs	start 4th packer readings
2134hrs	packer test is completed and start to deflate packer
2155hrs	putting rods back down hole and start drilling
2245hrs	stand-by technical pb; part at the top of core barrel has to be changed (lifter case)
2300hrs	continue coring
2315hrs	pull rods as bit seems to be worn down
2315hrs	drilling again
0015hrs	drilled to 26.3m
0045hrs	start 5th packer test
0145hrs	packer test finished and packer out of hole
0230hrs	drilled to 29.3m= EOH; BR and CBL spot hole MPV-04-143 on dyke 2
0250hrs	put packer in hole and start 6 th packer test
0330hrs	packer test ended
0400hrs	packer removed
0415hrs	look for reflex and start reflex
0445hrs	reflex ended, start pulling rods, pulling casing
	grouted

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FIELD DRILL PERFORMANCE LOG

PROJECT	**Gahcho Kue Geotech**
PROJECT NO	**2CD002.11**
NORTHING	7035668.19
EASTING	589270.47
SURFACE ELEVATION	404.23
AZIMUTH	0
DIP	90

HOLE NO:	**MPV-04-141c**
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	1700hrs 18/02/2004
FINISH DATE AND TIME	20/02/2004 0700hrs
HOLE DIAMETER	47.6 (NQ)
DRILLING METHOD	Diamond core

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
DS 0700-1900	R Bowden	18/02/2004						0	0	0.00	0	0	0	0.00
NS 1900-0700	B Rameseder	18/02/2004	1900	12	1.5	11.40	casing to 9m depth, slow drilling as corir	11.4	10.5	1.09	12	1.5	10.5	1.09
DS 0700-1900	R Bowden	19/02/2004		12	8	23.30	drill and packer, repeat	11.9	4	2.98	24	9.5	14.5	1.61
NS 1900-0700	B Rameseder	19/02/2004		12	9.75	29.30	3 packer tests, drilling, change bit, reflex	6	2.25	2.67	36	19.25	16.75	1.75

OVERALL HOLE DRILL RATE (m/hr)	0.81
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	1.75

GENERAL GEOTECH LOG

DRILLHOLE ID: **MPV-04-141c**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
0.00	1.70	1.70	ICE							
1.70	3.50	1.80	Water							
3.50	5.10	1.60	OVB	1.00	62.5	1.00	62.5	1.00	62.5	OVB=overburden; 3 countryrock boulders (29, 21, 14cm long),granite (reddish and mafic); 33cm of soil sample recovered (4.77-5.1m): grey-brown, clay and silt some sand, trace gravel; loose-very loose density, wet (was frozen solid when receiving in shack), subangular-angular gravel consisting of pieces of countryrock eg granite, various mineralogies (quartz, feldspar, mica, amphibole, garnet?), no stratification or organics visible
5.10	7.80	2.70	OVB	1.25	46.3					granitic boulders (pink, mafic rich), gneissic (mafic, biotite rich) cobbles and boulders, granitic cobbles (red, rich on mafic minerals)
7.80	8.12	0.32	OVB	0.32	100.0					granodiorite and gneiss boulder (each 8cm), granite boulder (6cm) and pebbles/cobbles of different lithologies (ream material?)
8.12	10.60	2.48	OVB/GR	*1.70*	*100.0*	*1.70*	*100.0*	*1.70*	*100.0*	BEDROCK at 8.90m granite: reddish-grey-white, biotite rich, compact, slightly weathered as the rock is not as fresh and compact as the other granite (pink one); only bedrock recovery quantified
10.60	11.30	0.70	GR	0.70	100.0	0.70	100.0	0.70	100.0	
11.30	14.30	3.00	GR	2.70	90.0	2.61	87.0	2.53	84.3	
14.30	17.30	3.00	GR	3.00	100.0	2.90	96.7	2.84	94.7	
17.30	20.30	3.00	GR	3.00	100.0	3.00	100.0	3.00	100.0	
20.30	23.30	3.00	GR	3.00	100.0	3.00	100.0	3.00	100.0	
23.30	26.30	3.00	GR	2.94	98.0	2.91	97.0	2.81	93.7	
26.30	29.30	3.00	GR	2.98	99.3	2.94	98.0	2.88	96.0	**EOH**

DETAILED GEOTECHNICAL LOG

DRILLHOLE ID: MPV-04-141c

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling**BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

FROM (m)	TO (m)	ROCK TYPE	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of Sets	Type	Totals	JOINT CONDITIONS				COMMENT
			STRONG R	WEAK R	% WEAK	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH				ANGLE	ROUGH	ALT	FILL	
8.9	10.6	GRN	R4		0	6	0	2	0	0	0	0	1	J1	2	75	7	0	3	some chlorite on joint J1
10.6	11.3	GRN	R5		0	1	0	0	0	0	0	0	0							
11.3	14.3	GRN	R5		0	13	0	3	0	0	0	0	3	J1	1	36	5	0	9	v
														J2	1	42	4	0	9	
														J3	1	66	5	0	9	
14.3	17.3	GRN	R5		0	15	0	5	0	0	0	0	2	J1	1	42	4	0	2	J1 has thin calcite coating, almost complete; J2 ... 2 joints with calcite, 1 joint with hematite, 1 joint with partial silt coating
														J2	4	60	4	0	3	
17.3	20.3	GRN	R5		0	15	0	1	0	0	0	0	1	J1	1	60	5	0	9	bright green (chlorite?) coating covering 10% of joint surface
20.3	23.3	GRN	R5		0	5	0	2	0	0	0	0	2	J1	1	60	5	0	9	J1 has partial calcite coating
														J2	1	40	5	0	9	
23.3	26.3	GRN	R4		0	9	0	4	0	0	0	0	2	J1	1	46	5	0	9	4 sets of joints; J4, angle 43, rough 2, alt 0, fill 9, 1 joint
														J2	1	63	7	0	3	
														J3	1	47	4	0	3	
26.3	29.3	GRN	R4			15	0	12	0	0	0	0		J1	1	82	1	0	3	4 joint sets; J42/20/2004 3 joints, angle 60, rough 2, alt 0, fill 9, seems fresher than other sets. Sets J1, J2, J3 have coating with green mineral and sometimes with traces of calcite
														J2	5	55	2	0	3	
														J3	3	57	5	0	3	
EOH																				

Photo Record

MPV-04-141c

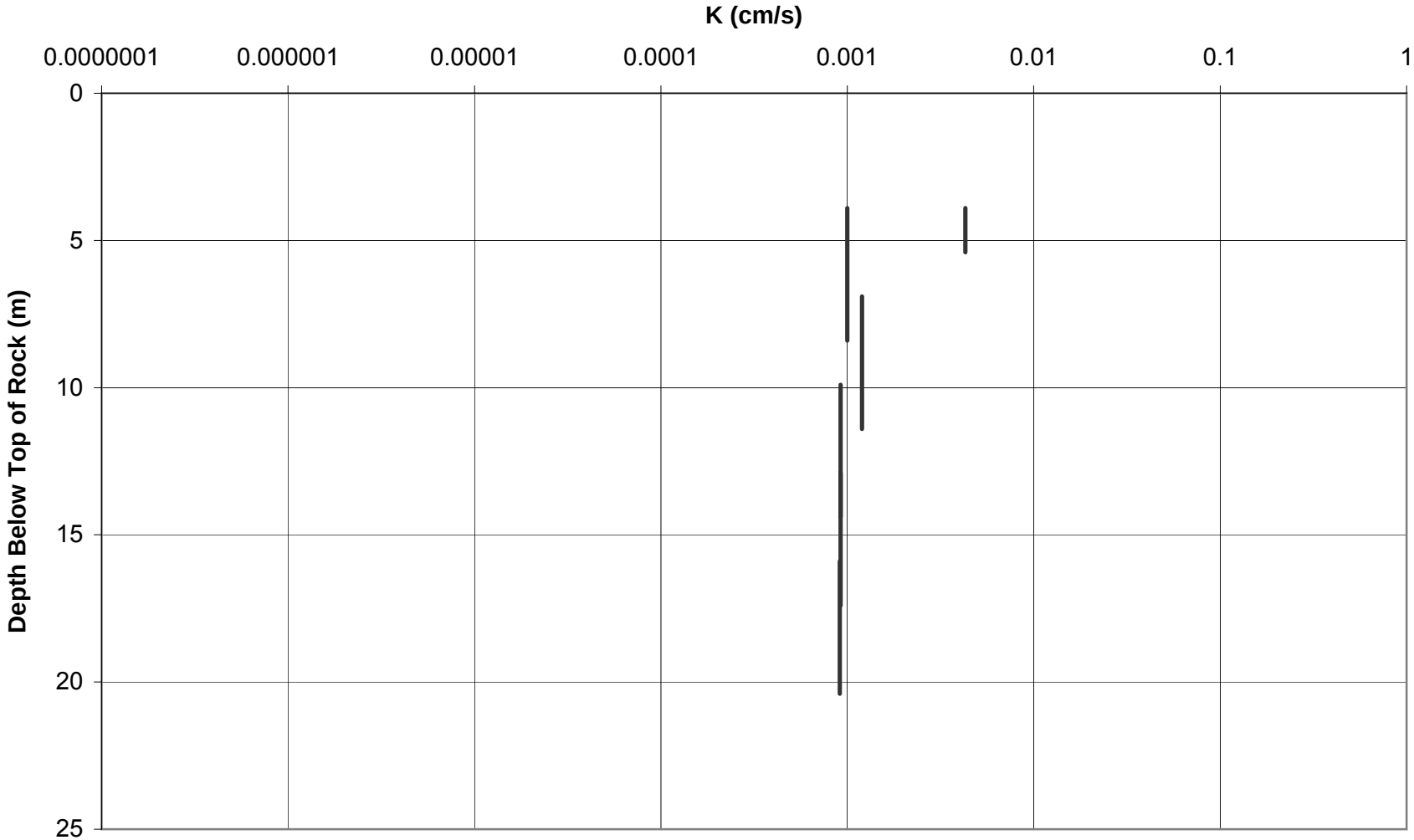
Date	Shift	Filename	Depth	Description
18/02/2004	NS 1900-0700	MPV-04-141c-4.77m-Box1-seds1	4.77-4.97m	sediments in overburden
18/02/2004	NS 1900-0700	MPV-04-141c-4.77m-Box1-seds2	4.77-4.97m	sediments in overburden
18/02/2004	NS 1900-0700	MPV-04-141c-4.97m-Box1-seds	4.97-5.11m	sediments in overburden
18/02/2004	NS 1900-0700	MPV-04-141c-3.5m-Box1-dry	3.5-9.5m	overburden with sediments and granite
19/02/2004	DS 0700-1900	MPV-04-141c-9.5m-Box2-dry	9.5 - 14.3m	GRN
19/02/2004	DS 0700-1900	MPV-04-141c-14.3m-Box3-dry	14.3 - 18.6m	GRN
19/02/2004	DS 0700-1900	MPV-04-141c-18.6m-Box4-dry	18.6 - 22.90m	GRN
19/02/2004	NS 1900-0700	MPV-04-141c-22.9.6m-Box5-dry	22.9-27.25m	GRN
19/02/2004	NS 1900-0700	MPV-04-141c-27.25m-Box6-dry	27.25-29.3m	GRN; **EOH**

Core Box Record

MPV-04-141c

Box	From	To	Comments
1	3.50	9.50	overburden, sediments and granite
2	9.50	14.30	granite
3	14.30	18.60	granite
4	18.60	22.90	granite
5	22.90	27.25	granite
6	27.25	29.30	granite, EOH

Permeability vs Depth
MPV_04_141C



Packer Test Data

Date	19-Feb-04
Staff	R. Bowden, B. Ramesede
Init. WL:	0
Ref. Pt.	drill shack floor
Dip	90

MPV-04-141c

Test 1 **12.8** **14.3**

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pres (psi)	Comments
1	0	12.00		4.5	**no leaks**
	1	15.90	3.90		
	2	19.60	3.70		
	3	23.50	3.90		
	4	27.30	3.80		
	5	31.00	3.70		
2	0			8.5	
	1	42.00	42.00		
	2	48.85	6.85		
	3	55.60	6.75		
	4	62.30	6.70		
	5	69.00	6.70		
	5	75.80	6.80		
3	0	86.00		11.5	
	1	93.90	7.90		
	2	101.70	7.80		
	3	109.70	8.00		
	4	117.50	7.80		
	5	125.40	7.90		
4	0	32.00		7.0	
	1	37.80	5.80		
	2	43.70	5.90		
	3	49.30	5.60		
	4	55.10	5.80		
	5	60.70	5.60		
	6	66.50	5.80		
5	0	72.00		4.5	
	1	76.00	4.00		
	2	79.90	3.90		
	3	83.90	4.00		
	4	87.80	3.90		
	5	91.80	4.00		

Summary 12.8 - 14.3m

Flow rate (gpm)	Pressure (psi)
3.80	4.5
6.70	8.5
7.80	11.5
5.80	7.0
4.00	4.5

Test 2 12.8 17.3

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pres (psi)	Comments
1	0	1.50		4.5	no leaks
	1	3.50	3.50		
	2	5.00	1.50	.	
	3	6.50	1.50		
	4	8.30	1.80		
	5	9.65	1.35		
	6	11.20	1.55		
	7	13.10	1.90		
	8	14.70	1.60		
	9	16.25	1.55		
	10	17.95	1.70		
	11	19.35	1.40		
	12	21.00	1.65		
	13	22.70	1.70		
2	0	49.00		8.0	
	1	54.20	5.20		
	2	59.20	5.00		
	3	64.40	5.20		
	4	69.40	5.00		
	5	74.60	5.20		
3	0	76.00		11.8	
	1	83.10	7.10		
	2	89.60	6.50		
	3	96.60	7.00		
	4	103.65	7.05		
	5	110.20	6.55		
	1	117.20	7.00		
	2	124.20	7.00		
4	0	32.00		8.0	
	1	37.40	5.40		
	2	42.20	4.80		
	3	47.80	5.60		
	4	53.00	5.20		
	5	58.10	5.10		
	1	63.30	5.20		
5	0	78.00		5.0	
	1	81.20	3.20		
	2	84.90	3.70		
	3	88.50	3.60		
	4	91.70	3.20		
	5	95.40	3.70		
	6	98.90	3.50		
	7	102.30	3.40		

Summary 12.8 17.3m

Flow rate (gpm)	Pressure (psi)
1.70	4.5
5.10	8.0
7.00	11.8
5.20	8.0
3.50	5.0

Test 3 15.8 20.3

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pres (psi)	Comments
1	0	2.55		4.4	no leaks
	1	5.20	2.65		
	2	7.65	2.45		
	3	10.10	2.45		
	4	12.70	2.60		
	5	15.30	2.60		
2	0	35.50		10.0	
	1	41.60	6.10		
	2	48.20	6.60		
	3	54.30	6.10		
	3	60.10	5.80		
	4	66.20	6.10		
	5	72.30	6.10		
3	0	85.00		14.0	
	1	92.70	7.70		
	2	100.40	7.70		
	3	108.10	7.70		
	4	115.90	7.80		
	5	123.60	7.70		
4	0	34.00		9.0	
	1	39.90	5.90		
	2	45.90	6.00		
	3	51.90	6.00		
	4	57.80	5.90		
	5	63.80	6.00		
5	0	69.00		4.5	
	1	73.10	4.10		
	2	77.00	3.90		
	3	80.90	3.90		
	4	85.00	4.10		
	5	89.00	4.00		

Summary 15.8 - 20.3

Flow rate (gpm)	Pressure (psi)
2.60	4.4
6.00	10.0
7.70	14.0
6.00	9.0
4.00	4.5

Test 4 18.8m 23.30m

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pres (psi)	Comments
1	0	2035.70		6.0	no leaks
	1	2039.00	3.30		
	2	2042.00	3.00		
	3	2045.30	3.30		
	4	2048.70	3.40		
	5	2051.70	3.00		
	6	2055.00	3.30		
2	0	2066.00		12.0	no leaks
	1	2071.90	5.90		
	2	2077.70	5.80		
	3	2083.70	6.00		
	4	2089.40	5.70		
	5	2095.40	6.00		
	6	2101.20	5.80		
	7	2107.00	5.80		
3	0	2121.20		18.0	no leaks
	1	2129.00	7.80		
	2	2136.70	7.70		
	3	2144.60	7.90		
	4	2152.10	7.50		
	5	2159.9	7.80		
4	0	2167.00		12.0	no leaks
	1	2173.70	6.70		
	2	2180.00	6.30		
	3	2186.50	6.50		
	4	2193.00	6.50		
	5	2199.40	6.40		
	6	2205.90	6.50		
5	0	2210.50		6.0	no leaks
	1	2214.40	3.90		
	2	2218.10	3.70		
	3	2221.80	3.70		
	4	2225.50	3.70		
	5	2229.30	3.80		

Summary 18.8 - 23.3

Flow rate (gpm)	Pressure (psi)
3.20	6.0
5.80	12.0
7.70	18.0
6.50	12.0
3.70	6.0

Test 5 21.8 26.3

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pres (psi)	Comments
1	0	2263.70		7.5	no leaks
	1	2268.40	4.70		
	2	2272.90	4.50		
	3	2277.50	4.60		
	4	2282.00	4.50		
	5	2286.70	4.70		
	6	2291.5	4.80		
	7	2296.30	4.80		
2	0	2309.00		15.0	no leaks
	1	2316.00	7.00		
	2	2323.00	7.00		
	3	2329.80	6.80		
	4	2336.70	6.90		
	5	2343.70	7.00		
3	0	2359.80		23.0	no leaks
	1	2368.50	8.70		
	2	2377.50	9.00		
	3	2386.50	9.00		
	4	2395.40	8.90		
	5	2404.4	9.00		
4	0	2411.70		15.0	no leaks
	1	2419.00	7.30		
	2	2426.10	7.10		
	3	2433.40	7.30		
	4	2440.50	7.10		
	5	2447.80	7.30		
	6	2455.00	7.20		
5	0	2460.50		7.5	no leaks
	1	2465.20	4.70		
	2	2469.80	4.60		
	3	2474.60	4.80		
	4	2479.20	4.60		
	5	2484.00	4.80		
	6	2488.80	4.80		
	7	2493.50	4.70		

Summary21.8 - 26.3

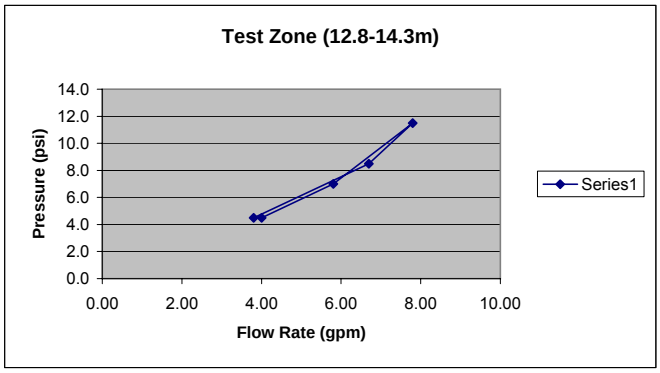
Flow rate (gpm)	Pressure (psi)
4.80	7.5
6.90	15.0
9.00	23.0
7.20	15.0
4.80	7.5

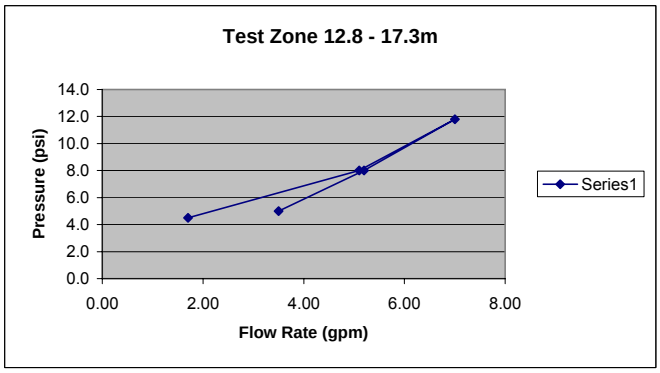
Test 5 24.8 29.3

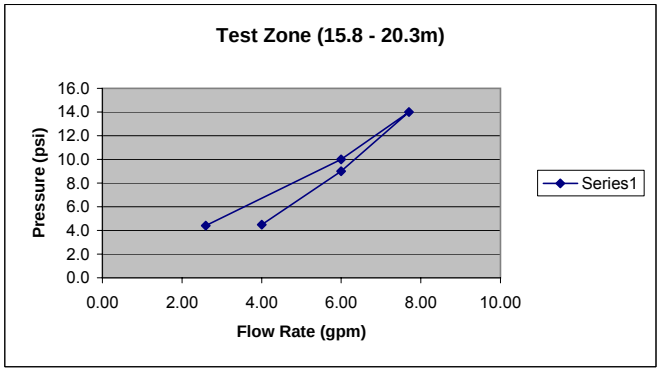
Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pres (psi)	Comments
1	0	2520.50		9.5	no leaks
	1	2526.30	5.80		
	2	2532.20	5.90		
	3	2538.00	5.80		
	4	2543.90	5.90		
	5	2549.60	5.70		
	6	2555.30	5.70		
	7	2561.00	5.70		
2	0	2569.00		18.0	no leaks
	1	2577.50	8.50		
	2	2586.00	8.50		
	3	2594.30	8.30		
	4	2602.80	8.50		
	5	2611.20	8.40		
3	0	2629.80		27.0	no leaks
	1	2640.10	10.30		
	2	2650.70	10.60		
	3	2661.10	10.40		
	4	2671.50	10.40		
	5	2682	10.50		
4	0	2691.00		18.0	no leaks
	1	2699.40	8.40		
	2	2707.80	8.40		
	3	2716.30	8.50		
	4	2724.80	8.50		
	5	2733.40	8.60		
5	0	2739.70		9.0	no leaks
	1	2745.70	6.00		
	2	2751.30	5.60		
	3	2757.40	6.10		
	4	2763.40	6.00		
	5	2769.30	5.90		
	6	2775.10	5.80		
	7	2780.90	5.80		

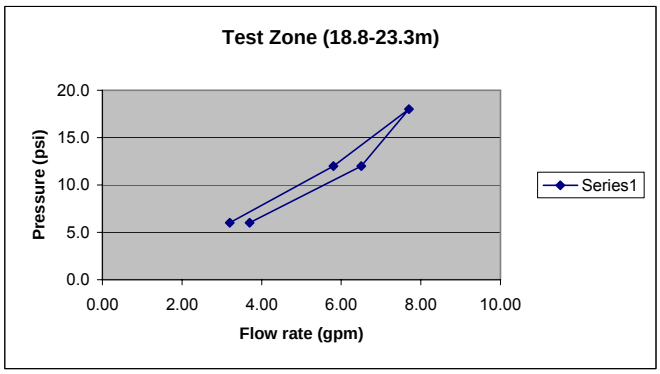
Summary 24.8 - 29.3

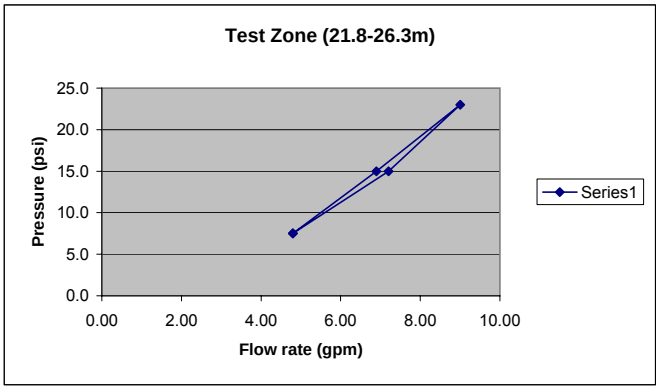
Flow rate (gpm)	Pressure (psi)
5.70	9.5
8.40	18.0
10.50	27.0
8.50	18.0
5.80	9.0

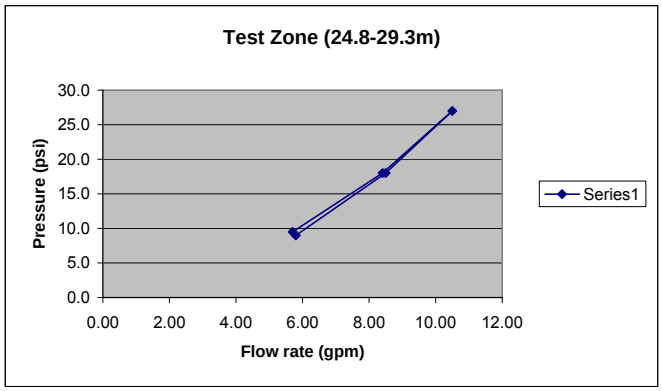

Test Zone (12.8-14.3m)
Pressure (psi)
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
0.00
2.00
4.00
6.00
8.00
10.00
Flow Rate (gpm)
Series1


Test Zone 12.8 - 17.3m
Pressure (psi)
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
0.00
2.00
4.00
6.00
8.00
Flow Rate (gpm)
Series1


Test Zone (15.8 - 20.3m)
Pressure (psi)
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
0.00
2.00
4.00
6.00
8.00
10.00
Flow Rate (gpm)
Series1


Test Zone (18.8-23.3m)
Pressure (psi)
20.0
15.0
10.0
5.0
0.0
0.00
2.00
4.00
6.00
8.00
10.00
Flow rate (gpm)
Series1


Test Zone (21.8-26.3m)
Pressure (psi)
25.0
20.0
15.0
10.0
5.0
0.0
0.00
2.00
4.00
6.00
8.00
10.00
Flow rate (gpm)
Series1


Test Zone (24.8-29.3m)
Pressure (psi)
30.0
25.0
20.0
15.0
10.0
5.0
0.0
0.00
2.00
4.00
6.00
8.00
10.00
12.00
Flow rate (gpm)
Series1

Permeability Summary

MPV-04-141c

from	to		Step 1	Step 2	Step 3	Step 4	Step 5	Avg K
12.8	14.3	gauge (psi)	4.5	8.5	11.5	7	4.5	
		Qavg (igpm)	3.8	6.7	7.8	5.8	4	
		K cm/sec	**4.5E-03**	**4.2E-03**	**3.6E-03**	**4.4E-03**	**4.7E-03**	4.3E-03
12.8	17.3	gauge (psi)	4.5	8	11.8	8	5	
		Qavg (igpm)	1.7	5.1	7	5.2	3.5	
		K cm/sec	**6.7E-04**	**1.1E-03**	**1.0E-03**	**1.1E-03**	**1.2E-03**	1.0E-03
15.8	20.3	gauge (psi)	4.4	10	14	9	4.5	
		Qavg (igpm)	2.6	6	7.7	6	4	
		K cm/sec	**1.0E-03**	**1.1E-03**	**9.7E-04**	**1.2E-03**	**1.6E-03**	1.2E-03
18.8	23.3	gauge (psi)	6	12	18	12	6	
		Qavg (igpm)	3.2	5.8	7.7	6.5	3.7	
		K cm/sec	**9.4E-04**	**8.5E-04**	**7.6E-04**	**9.6E-04**	**1.1E-03**	9.2E-04
21.8	26.3	gauge (psi)	7.5	15	23	15	7.5	
		Qavg (igpm)	4.8	6.9	9	7.2	4.8	
		K cm/sec	**1.1E-03**	**8.1E-04**	**6.9E-04**	**8.5E-04**	**1.1E-03**	9.2E-04
24.8	29.3	gauge (psi)	9.5	18	27	18	9	
		Qavg (igpm)	5.7	8.4	10.5	8.5	5.8	
		K cm/sec	**1.1E-03**	**8.2E-04**	**6.9E-04**	**8.3E-04**	**1.1E-03**	9.1E-04

Equations:

$Hf = 8.65x10^{-15} (Q^2 * Lp/rp^5)$

$H_{nit} = (Dw'+Hg-Hf)+Pg/1.42$

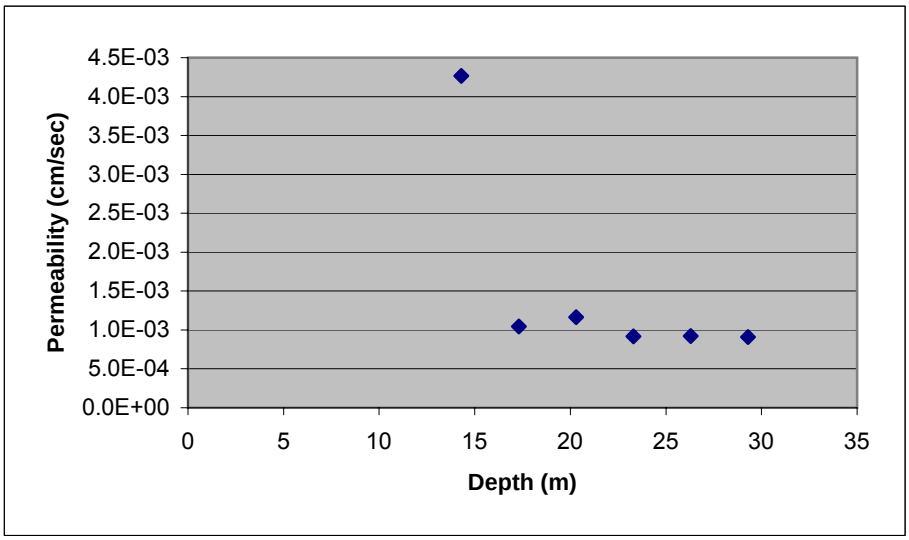
$K = (Q*Ln(R/r_b))/2*\pi*H_{nit}*L)$

Overall **1.5E-03**

assume
- vertical drillhole
- water at ground surface
- height of gauge is at rig flr
- negligible friction losses

Dw	Measured depth of static water (1)	*0*	m
Dp	Measured depth to packer		m
Dt	Depth to midpoint of test		m
Inc	Inclination from horizontal		m
Dw'	Vertical depth to static water level	90	°
Dp'	Vertical depth to packer		m
Dt'	Vertical depth to midpoint of test		m
Hg	Gauge height	*0*	m
Lp	Length of discharge pipe		m
rp	Radius of discharge pipe (1" = 0.0127m)		m
R	Radius of influence (10m is standard)	10	m
rb	Drillhole radius (HQ=0.048m, NQ=0.038m)	0.038	m
L	Length of test section		m
Hf		0	m

cm/sec



Reflex Readings **MPV-04-141C**

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Field	Temp ©
20-Feb-04	29.3	131.8	89.2	44.8	5907	8.5

FIELD GEOLOGICAL LOG

HOLE ID MPV-04-141c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	3.50	Ice/Water	n/a	1.7m ice, to 3.5m water	RB/BR
3.50	8.90	Overburden	n/a	Overburden; 3 countryrock boulders (29, 21, 14cm long),granite (reddish and mafic); 33cm of soil sample recovered (4.77-5.1m): grey-brown, clay and silt some sand, trace gravel; loose-very loose density, wet (was frozen solid when receiving in shack), subangular-angular gravel consisting of pieces of countryrock eg granite, various mineralogies (quartz, feldspar, mica, amphibole, garnet?), no stratification or organics visible	RB/BR
8.90	29.30	Granite	n/a	Granite reddish-grey-white, biotite rich, compact, slightly weathered as the rock is not as fresh and compact as the other granite (pink one); hematite inclusions?	RB/BR
EOH					

POINT LOAD TEST - INPUT

DRILL HOLE ID:

No. #	Tested by	DATE	HOLE/ FACE ID	DIST. (m)	ROCK TYPE	TEST TYPE	ORINT	DAYS	W (mm)	D (mm)	P (kN)	COMMENT
1	SM	FEB-20-04	**MPV-04-141C**	27.5	**GRANITE**	1		0.5		48	**22**	*GOOD BREAK*
2	SM	FEB-20-04	**MPV-04-141C**		**GRANITE**	1		0.5		48	**20**	*GOOD BREAK*
3	SM	FEB-20-04	**MPV-04-141C**	27.9	**GRANITE**	1		0.5		48	**20**	*SLIGHTLY ANGLED BREAK*
1	SM	FEB-20-04	**MPV-04-141C**		**GRANITE**	1		0.5		48	**20**	*GOOD BREAK*
2	SM	FEB-20-04	**MPV-04-141C**		**GRANITE**	1		0.5		48	**17**	*ANGLED BREAK*
3	SM	FEB-20-04	**MPV-04-141C**		**GRANITE**	1		0.5		48	**19**	*CHIP OUT THEN BROKE*

UCS SAMPLES

HOLE ID: MPV-04-141C

HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-141C	6	27.55	GRANITE	04-UCS-141-001

MPV_04_141C

Diary MPV-04-143c

NS 19/02/2004

drillhole location re-established; measured from MPV-04-133c (D2-A-7T)

DS 20/02/2004

moved from MPV-04-141c, Dyke 4
1500' of sludge lines laid to disposal site N of MPV-04-126c

NS 20/02/2004

1900hrs	prepare ice-cutter and drill
2145hrs	start first run to closest boulder, as rods shake, casing is set into first boulder
0015hrs	start coring
0315hrs	return lost (maybe sand, gravel underneath, drilled faster), pull tube
0330hrs	pull tube 1 in order to put empty plastic tube in
0340hrs	tube 1 pulled
0345hrs	tube 2 removed as end of run, soft material, for new run one of the modified finger traps will be used (as soft material); no recovery for tube 2
0415hrs	rod added and drilled to 5.2m,
0450hrs	no recovery; changed seal ring on inner tube
0530hrs	add rod; hit hard material again
0630hrs	5.2-5.5m, no recovery;

DS 21/02/2004

0700	rig floor at 0.0m top of ice at 0.6m bottom of ice at 2.3m lake bed at 2.8m casing set on lake bottom at 2.8m (3m of pipe and 0.2m stickup above rig floor)
730	hard drilling for .5m then soft
0810	at 6.8m (from rig floor); lifter case crimped at lower end; core barrel broken at approx 1m from bit; speculate that barrel was damaged by deflecting off of boulders
1010	attempted to recover remaining barrel; failed
1020	changed plastic wear ring in chuck
1050	reamed HW casing to approx 6.8m; 1.3m stick up too much; no HW-NW adaptor on site
1245	pulled HW and reamed NW to 7.0m (6m+2ft + 2ft = 7.2m casing minus 0.2m stickup); that is 0.2m below lost S core barrel tip drilled NQ to 9.7m (4m+3m+3m rods, minus 0.3m stickup)
1445	still in sand and boulders (inferred from drill response); pulled rods and reamed casing deeper to 8.7m (3+3+3 - 0.3m stickup).
1700	rods and casing binding; casing self-separated just below rig floor; rods significantly out of alignment because of drillhole crookedness pulled rods and casing in tandem because they were bound together.
1830	casing at 8.7m again (3+3+3 - 0.3 stickup)

NS 21/02/2004

2000hrs	bolts on hydraulique cylinder behind the head lifter are loose
2030hrs	hydraulique cylinder is broken
2300hrs	start drilling, cylinder was welded

0015hrs clean hole, rod finished (to 11.7m), start to add casing as material above caved in, stabalize hole in bedrock
0045hrs part at hyrdaulique cylinder broke again
0200hrs part welded and additional casing is put down
0250hrs finished casing
0330hrs finished run to 14.4m, getting packer ready
0450hrs packer installed (had to brought from container, warmed up; the same for nitrogene gage)
0455hrs start packer test (12.9-14.4m)
0530hrs packer test finished
0545hrs rod added

DS 22/02/2004

0930 packer test (12.9 - 17.4m) completed
1100 re-welded piston on drill head
1410 packer test (15.9 - 20.4m) completed
pulled rods at 22.2 because of high pump pressure; removed rock in bit
1710 packer test (18.9 - 23.4m) completed
1800 at 26.4m
1840 at 29.4m

NS 22/02/2004

pull rods, first attempt to put packer down did not work as water flow up hole; had to be put deeper (too much tape around ball to let packer down)
2050hrs start packer test
2125hrs packer test ended
2150hrs packer pulled; prepare for reflex
2300hrs reflex completed
cement hole, spot new hole, get ready to move

SRK Consulting
Engineers and Scientists

FIELD DRILL PERFORMANCE LOG

PROJECT	**Gahcho Kue Geotech**
PROJECT NO	**2CD002.11**
NORTHING	7035 409.9
EASTING	588 840.2
SURFACE ELEVATION	404
AZIMUTH	0
DIP	90

HOLE NO:	**MPV-04-143c**
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	20-Feb-04 7:00am
FINISH DATE AND TIME	23-Feb-04 0:00am
HOLE DIAMETER	47.6 (NQ)
DRILLING METHOD	Diamond core

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
DS 0700-1900	R Bowden	20/02/2004		12	12		moved	0	0	0.00	0	0	0	0.00
NS 1900-0700	B Rameseder	20/02/2004		12	5.8	5.50	made ice-cutter, 3m casing (SQ), drilling SQ to 5.5m, not much recovery	5.5	6.2	0.89	12	5.8	6.2	0.89
DS 0700-1900	R Bowden	21/02/2004		12	6	9.70	broke S core barrel; changed to HW casing, changed to NW casing	4.2	6	0.70	24	11.8	12.2	0.80
NS 1900-0700	B Rameseder	21/02/2004		12	8	17.40	hydraulique cylinder had to be welded twice, added casing, 1 packer test	7.7	4	1.93	36	19.8	16.2	1.07
DS 0700-1900	R Bowden	22/02/2004		12	5	29.40	welded hydraulic cylinder again; 3 packer tests	12	7	1.71	48	24.8	23.2	1.27
NS 1900-0700	B Rameseder	22/02/2004		12	12	29.40	1 packer test, reflex, cement hole, pull down, move	0	0	#DIV/0!	60	36.8	23.2	1.27

OVERALL HOLE DRILL RATE (m/hr)	0.41
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	1.27

GENERAL GEOTECH LOG

DRILLHOLE ID: **MPV-04-143c**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
0.00	2.30	2.30	Ice							
2.30	2.80	0.50	Water							2.4m depth (Boart Longyear: 5 feet ice and 2 feet water)
2.80	3.70	0.90	OVB	0.88	97.8					tube started at 2.88m (if 1.5m tube - 0.68m empty space in tube); granite boulder at bottom of tube (min 25cm)
3.70	4.00	0.30	OVB	0.00						no recovery (drill response suggests soft material)
4.00	5.20	1.20	OVB	0.00						no recovery (with finger trap)
5.20	5.50	0.30	OVB	0.00						no recovery
5.50	6.70	1.20	OVB	0.00						see diary for depth calculations; no recovery, no residue, finger trap fingers closed, bottom of lifter case crimped/flared outward; rods pulled; core barrel broken approx 1 from bit; attempted to recover lost portion
6.70	9.70	0.50	OVB/Bedrock	0.50	100.0	0.38	76.0	0.24	48.0	BEDROCK interpreted at 9.2m; recovery measured for bedrock only
9.70	9.80	0.10	Caved-in	0.78	780.0					Caved material (cobbles and boulders, partially redrilled material: first 78cm
9.80	11.40	1.60	MD	1.62	101.3	1.55	96.9			MD: Mafic dyke; chlorite rich, compact, dark green black, medium to fine
11.40	14.40	3.00	MD	3.00	100.0	2.78	92.7	2.42	80.7	
14.40	17.40	3.00	MD	3.00	100.0	2.92	97.3	2.83	94.3	
17.40	20.40	3.00	MD	3.00	100.0	2.90	96.7	2.76	92.0	
20.40	22.20	1.80	MD	1.80	100.0	3.00	1.8	1.80	100.0	
22.20	23.40	1.20	MD	1.20	100.0	1.20	100.0	1.20	100.0	
23.40	26.40	3.00	MD	3.00	100.0	3.00	100.0	3.00	100.0	
26.40	29.40	3.00	MD	3.10	103.3	3.05	101.7	2.80	93.3	27.8-28.2m: broken at joints due to drilling
	EOH									

DETAILED GEOTECHNICAL LOG DRILLHOLE ID: **MPV-04-143c**

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

FROM	TO	ROCK	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of			JOINT CONDITIONS				COMMENT
(m)	(m)	TYPE	STRONG R	WEAK R	% WEAK	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH	Sets	Type	Totals	ANGLE	ROUGH	ALT	FILL	
9.2	9.7	**MD**	R5		0	5	0	2	0	0	0	0	1	J1	2	55	5	0	9	
																				MD: Mafic dyke
9.8	11.4	**MD**	R5		0	12	0	6	3	1	1	0	3	J1	4	65	7	0	3	
														J2	1	80	4	0	9	
														J3	1	55	2	0	3	Cemented joints broken open with chlorite filling: angle 25, rough 7, alt 0, fill 5
11.4	14.4	**MD**	R5		0	28	0	20	0	0	1	1	3	J1	5	65	7	0	9	Joint set 4: 5 joints, angle 20, rough 5, alt 0, fill 5; Joint set 5: 1 joint,
														J2	3	80	4	0	3	angle 10, rough 3, alt 0, fill 3; joint set 6: 1 joint, angle 15, rough 1, alt
														J3	5	80	3	0	3	0, fill 9; broken zone at 13.80-13.90m (between joints but probably due to machine breaks
14.4	17.4	**MD**	R5		0	19	0	5	0	0	0	0	3	J1	1	40	5	0	8	
														J2	1	50	7	0	9	J1 has 2mm weathered silty/clay gouge; J2 has thin partial thin silt
														J3	3	70	4	0	9	coating
17.4	20.4	**MD**	R5		0	15	0	7	2	1	0	0	3	J1	2	25	4	0	8	
														J2	2		4	0	8	
														J3	2	65	4	0	6	
20.4	22.2	**MD**	R5		0	15	0	1	0	0	0	0	1	J1	1	20	1	0	9	
22.2	23.4	**MD**	R5		0	5	0	4	0	0	1	1	2	J1	1	48	5	0	9	
														J2	3		4	0	9	J2 has joints at 20, 30 and 40 degrees + similar to microfactures
																				which are random; 20 defgree joint has hematite stainin
23.4	26.4	**MD**	R5		0	10	0	4	2	2	0	0	2	J1	3	65	5	0	9	
														J2	1	30	4	0	9	J1 has planar and rough joint conditions
26.4	29.4	**MD**	R5		0	27	0	18	3	1	1	1	3	J1	7	35	4	0	3	
														J2	2	25	5	0	3	
														J3	6	85	4	0	9	joint set 4: 3 joints, angle 15, rough 5, alt 0, fill 6, 27.8-28.2m: broken at joints due to drilling

Photo Record

MPV-04-143c

Date	Shift	Filename	Depth	Description
21/02/2004	NS 1900-0700	MPV-04-140c-0m-Box1-dry	6.7-11.78	overburden, mafic dyke
22/02/2004	DS 0700-1900	MPV-04-143c-11.78m-Box2-dry	11.78 - 16.10	mafic dyke
22/02/2004	DS 0700-1900	MPV-04-143c-16.1m-Box3-dry	16.1 - 20.2	mafic dyke
22/02/2004	DS 0700-1900	MPV-04-143c-20.2m-Box4-dry	20.2 - 24.3	mafic dyke
22/02/2004	NS 1900-0700	MPV-04-143c-24.3m-Box5-dry	24.3-28.45	mafic dyke
22/02/2004	NS 1900-0700	MPV-04-143c-28.45m-Box6-dry	28.45-29.4	mafic dyke, EOH

Core Box Record

MPV-04-143c

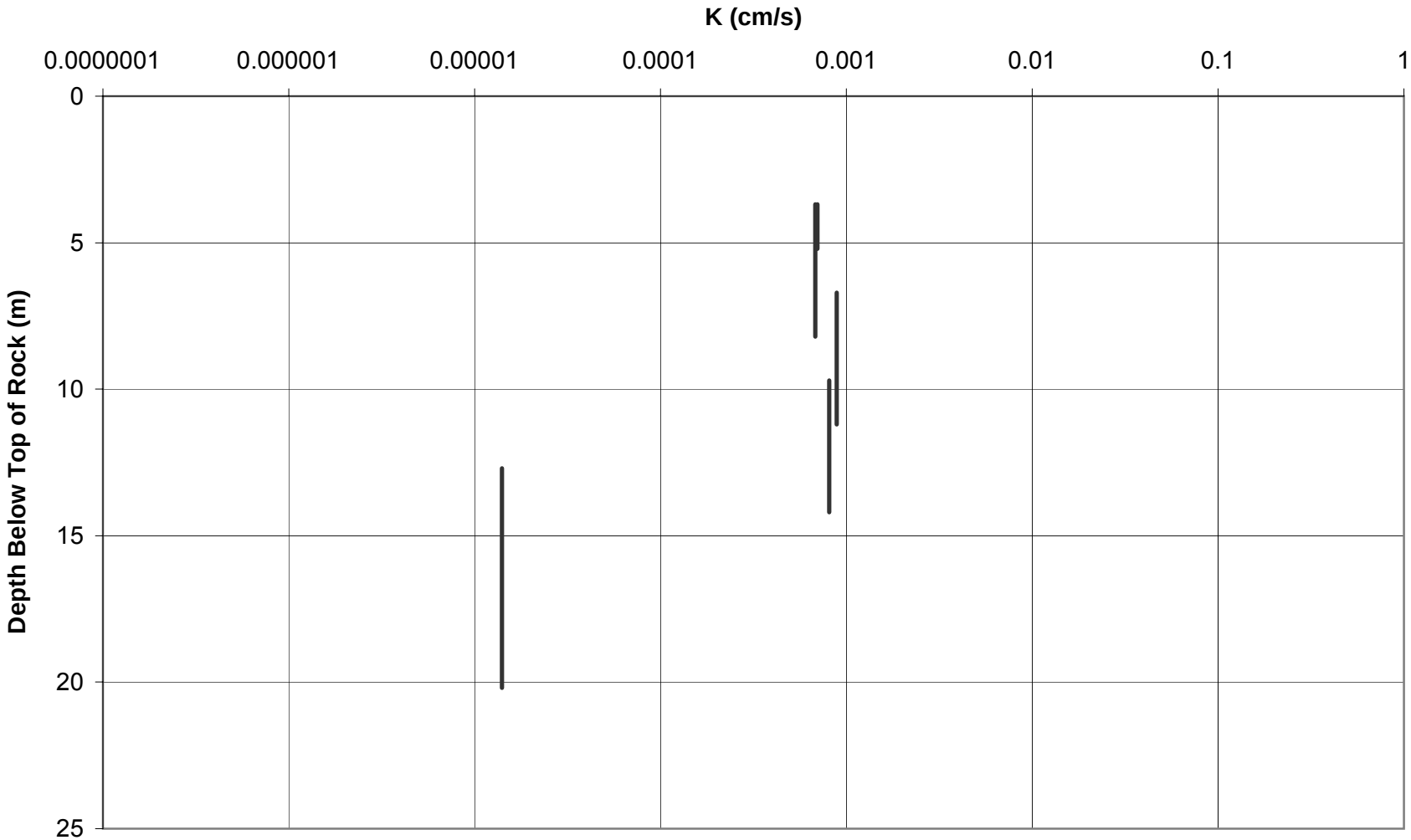
Box	From	To	Comments
Tube 1	2.80	3.70	big boulder granite/gneiss at bottom (min 25cm long)
Box 1	6.70	11.78	overburden, mafic dyke
Box 2	11.78	16.10	mafic dyke
Box 3	16.10	20.20	mafic dyke
Box 4	20.20	24.30	mafic dyke
Box 5	24.30	28.45	mafic dyke
Box 6	28.45	29.40	mafic dyke; EOH

FIELD GEOLOGICAL LOG

HOLE ID: MPV-04-143C

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	2.80	Ice/Water	n/a	2.3m ice to 2.8m water	RB/BR
2.80	9.20	Overburden	n/a	Overburden (partially no recovery with Geobor S), boulders in the tube	RB/BR
9.20	29.40	Mafic Dyke	n/a	Mafic dyke; chlorte rich, compact, dark green black, medium to fine grained; 9.70-9.80m; caved material (cobbles and boulders, partially redrilled material; first 78cm of the run; put depth according to the end of the run and according to the solid core at the end.	RB/BR
E.O.H.					

Permeability vs Depth
MPV_04_143C



Packer Test Data

Date	22-Feb-04
Staff	R. Bowden, B. Ramesede
Init. WL:	0
Ref. Pt.	drill shack floor
Dip	90

MPV-04-143c

Test 1 **12.9** **14.4**

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pres (psi)	Comments
1	0	2794.40		3.0	**no leaks**
	1	2794.40	0.00		
	2	2794.40	0.00		
	3	2794.40	0.00		
	4	2794.40	0.00		
2	0	2794.50		5.5	**no leaks**
	1	2795.80	1.30		
	2	2797.10	1.30		
	3	2798.40	1.30		
	4	2799.70	1.30		
3	0	2801.40		7.0	**no leaks**
	1	2803.30	1.90		
	2	2804.90	1.60		
	3	2806.50	1.60		
	4	2808.10	1.60		
	5	2809.8	1.70		
4	0	2810.50		5.0	**no leaks**
	1	2811.45	0.95		
	2	2812.20	0.75		
	3	2813.15	0.95		
	4	2813.95	0.80		
	5	2814.75	0.80		
	6	2815.50	0.75		
5	0	2816.00		3.0	**no leaks**
	1	2816.10	0.10		

Summary 1

Flow rate (gpm)
0.00
1.30
1.60
0.80
0.10

	2	2816.20	0.10		
	3	2816.25	0.05		
	4	2816.35	0.10		
	5	2816.45	0.10		
	6	2816.50	0.05		
	7	2816.60	0.10		
	8	2816.70	0.10		

Test 2 **12.9** **17.4**

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pres (psi)	Comments
1	0	22.50		5.2	
	1	23.40	23.40		
	2	24.05	0.65		
	3	24.70	0.65		
	4	25.20	0.50		
	5	25.75	0.55		
	6	26.25	0.50		
2	0	33.00		8.7	
	1	37.60	4.60		
	2	42.20	4.60		
	3	46.90	4.70		
	4	51.50	4.60		
3	0	72.00		11.0	
	1	78.00	6.00		
	2	84.10	6.10		
	3	90.00	5.90		
	4	96.00	6.00		
4	0	0.00		8.2	
	1	4.50	4.50		
	2	8.90	4.40		
	3	13.40	4.50		
	4	17.80	4.40		
5	0	20.00		5.7	
	1	21.25	1.25		
	2	22.40	1.15		
	3	23.65	1.25		

Summary
Flow rate (gpm)
0.5
4.7
6.0
4.5
1.1

	4	24.80	1.15		
	5	25.80	1.00		
	6	26.90	1.10		
	7	28.00	1.10		

Test 3 **15.9** **20.4**

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pres (psi)	Comments
1	0	36.30		5.7	
	1	38.40	2.10		
	2	40.50	2.10		
	3	42.70	2.20		
	4	44.80	2.10	2.1	avg last 3 readings

Summary
Flow rate (gpm)
2.10
4.00

2	0	50.00		8.2		6.00
	1	54.20	4.20			4.50
	2	58.20	4.00			2.80
	3	62.30	4.10			
	3	66.30	4.00			
	4	70.30	4.00	4.0	avg last 3 readings	
3	0	78.00		12.5		
	1	84.00	6.00			
	2	89.90	5.90			
	3	95.90	6.00			
	4	101.90	6.00	6.0	avg last 3 readings	
4	0	7.00		8.2		
	1	11.40	4.40			
	2	16.00	4.60			
	3	20.40	4.40			
	4	24.90	4.50			
	5	29.40	4.50	4.5	avg last 3 readings	
5	0	32.00		4.4		
	1	34.70	2.70			
	2	37.40	2.70			
	3	40.10	2.70			
	4	42.90	2.80			
	5	45.65	2.75	2.8	avg last 3 readings	

Test 4 **18.9** **23.4**

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pres (psi)	Comments	
1	0	65.00		7.0		**Summary**
	1	67.90	2.90			Flow rate (gpm)
	2	70.90	3.00			
	3	73.95	3.05			3.00
	4	76.85	2.90			5.30
	5	79.80	2.95	3.0	avg last 3 readings	7.40
2	0	85.00		12.0		6.00
	1	90.30	5.30			4.00
	2	95.70	5.40			

	3	101.00	5.30		
	4	106.30	5.30	5.3	avg last 3 readings
3	0	15.00		18.2	
	1	22.30	7.30		
	2	29.70	7.40		
	3	37.00	7.30		
	4	44.40	7.40	7.4	avg last 3 readings
4	0	52.00		13.0	
	1	58.00	6.00		
	2	64.20	6.20		
	3	70.10	5.90		
	4	76.20	6.10		
	5	82.20	6.00	6.0	avg last 3 readings
5	0	86.50		7.3	
	1	90.50	4.00		
	2	94.50	4.00		
	3	98.50	4.00		
	4	102.50	4.00	4.0	avg last 3 readings

Test 5 **21.9** **29.4**

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pres (psi)	Comments
1	0	3386.30		8.0	
	1	3386.35	0.05		
	2	3386.43	0.08		
	3	3386.50	0.07		
	4	3386.60	0.10		
	5	3386.70	0.10		
2	0	3387.80		16.5	
	1	3388.20	0.40		
	2	3388.45	0.25		
	3	3388.70	0.25		
	4	3388.90	0.20		
	5	3389.10	0.20		
3	0	3390.00		25.0	
	1	3390.45	0.45		

Summary
Flow rate (gpm)
0.10
0.20
0.30
0.25
0.12

	2	3390.70	0.25		
	3	3391.03	0.33		
	4	3391.33	0.30		
	5	3391.625	0.30		
4	0	3391.70		16.5	
	1	3392.00	0.30		
	2	3392.25	0.25		
	3	3392.50	0.25		
	4	3392.75	0.25		
	5	3393.00	0.25		
5	0	3393.15		8.0	
	1	3393.20	0.05		
	2	3393.30	0.10		
	3	3393.45	0.15		
	4	3393.55	0.10		
	5	3393.65	0.10		
	6	3393.80	0.15		avg last 3 readings

L2.9 - 14.4m

Pressure (psi)
3.0
5.5
7.0
5.0
3.0

12.9	17.4

Pressure (psi)
5.2
8.7
11.0
8.2
5.7

15.9	20.4

Pressure (psi)
5.7
8.2

12.5
8.2
4.4

18.9	**23.4**

Pressure (psi)
7.0
12.0
18.2
13.0
7.3

21.9	29.4

Pressure (psi)
8.0
16.5
25.0
16.5
8.0

Permeability Summary

MPV-04-143c

from	to		Step 1	Step 2	Step 3	Step 4	Step 5	Avg K
12.9	14.4	gauge (psi)	3	5.5	7	5	3	
		Qavg (igpm)	0	1.3	1.6	0.8	0.1	
		K cm/sec	0.0E+00	1.3E-03	1.2E-03	8.5E-04	1.8E-04	7.0E-04
12.9	17.4	gauge (psi)	5.2	8.7	11	8.2	5.7	
		Qavg (igpm)	0.5	4.7	6	4.5	1.1	
		K cm/sec	1.7E-04	9.5E-04	9.6E-04	9.7E-04	3.4E-04	6.8E-04
15.9	20.4	gauge (psi)	5.7	8.2	12.5	8.2	4.4	
		Qavg (igpm)	2.1	4	6	4.5	2.8	
		K cm/sec	6.5E-04	8.6E-04	8.5E-04	9.7E-04	1.1E-03	8.9E-04
18.9	23.4	gauge (psi)	7	12	18.2	13	7.3	
		Qavg (igpm)	3	5.3	7.4	6	4	
		K cm/sec	7.6E-04	7.8E-04	7.2E-04	8.1E-04	9.7E-04	8.1E-04
21.9	29.4	gauge (psi)	8	16.5	25	16.5	8	
		Qavg (igpm)	0.1	0.2	0.3	0.25	0.12	
		K cm/sec	1.3E-05	1.3E-05	1.3E-05	1.6E-05	1.6E-05	1.4E-05
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	

Overall **6.2E-04**

Dw	Measured depth of static water (1)	*0*	m
Dp	Measured depth to packer		m
Dt	Depth to midpoint of test		m
Inc	Inclination from horizontal	*90*	m
Dw'	Vertical depth to static water level		°
Dp'	Vertical depth to packer		m
Dt'	Vertical depth to midpoint of test		m
Hg	Gauge height	*0*	m
Lp	Length of discharge pipe		m
rp	Radius of discharge pipe (1" = 0.0127m)		m
R	Radius of influence (10m is standard)	10	m
rb	Drillhole radius (HQ=0.048m, NQ=0.038m)	0.038	m
L	Length of test section		m
Hf		0	m

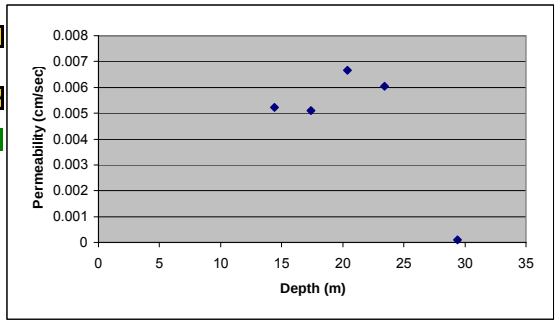
Equations:

$Hf = 8.65 \times 10^{-15} (Q^2 * Lp / rp^5)$

$H_{nit} = (Dw' + Hg - Hf) + Pg/1.42$

$K = (Q * Ln(R/r_b))/2 * \pi * H_{nit} * L)$

assume
- vertical drillhole
- water at ground surface
- height of gauge is at rig flr
- negligible friction losses



Reflex Readings **MPV-04-143C**

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Field	Temp ©
22-Feb-04	29.4	344	86.7	268.1	5875	6.6

Thermistor Readings

MPV-04-143c

Thermistor String ID **?????**

Thermis Node	Reading (kOhms)	Comments
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		

POINT LOAD TEST - INPUT

DRILL HOLE ID:

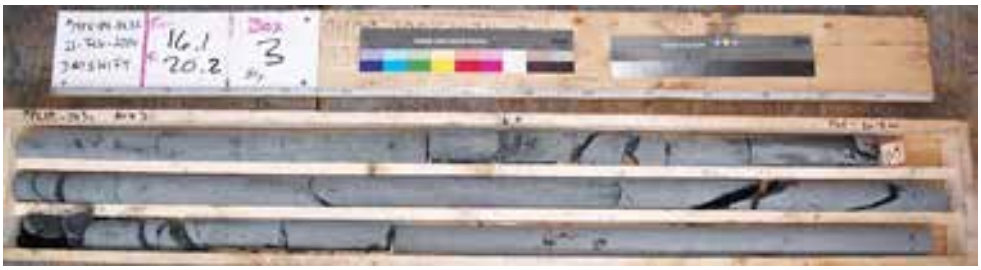
No. #	Tested by	DATE	HOLE/ FACE ID	DIST. (m)	ROCK TYPE	TEST TYPE	ORINT	DAYS	W (mm)	D (mm)	P (kN)	COMMENT
	JD	03/02/2004	MPV-04-143C	24.3	DIORITE	1					**31.78**	
	JD	03/02/2004	MPV-04-143C	25.0	DIORITE	2					**24.93**	
	JD	03/02/2004	MPV-04-143C	25.0	DIORITE	2					**30.47**	
	JD	03/02/2004	MPV-04-143C	25.0	DIORITE	2					**42.96**	
No. #	**Tested by**	**DATE**	**HOLE/ FACE ID**	**DIST. (m)**	**ROCK TYPE**	**TEST TYPE**	**ORINT**	**DAYS**	**W (mm)**	**D (mm)**	**P (PSI)**	**COMMENT**
	BAM	04/07/2004	MPV-04-143C	24.20	DIORITE	1	LEFT			47.40	2050.00	ANGLED BREAK
	BAM	04/07/2004	MPV-04-143C	24.20	DIORITE	1	LEFT			47.40		2ND TEST FAILED

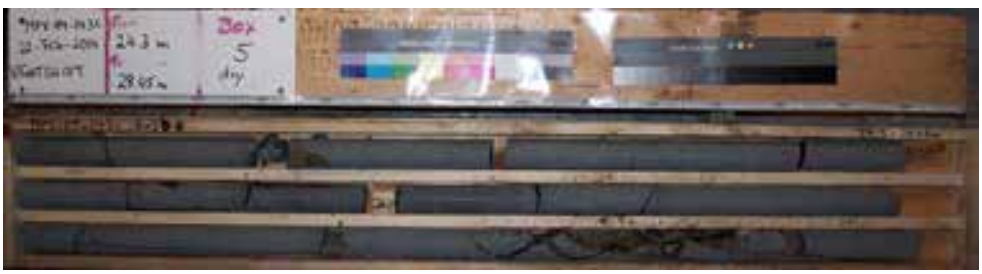
UCS SAMPLES

HOLE ID: MPV-04-143C

HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-143C	5	24.58	Granite	04-UCS-143-001

MPV_04_143C





Diary MPV-04-146c

NS 22/02/2004

drillhole location established; 2m from original picket to avoid original set up; ice thickness tested with ice auger (more than 42 inches)

DS 23/02/2004

NQ Drilling

1400 completed move; removed/ unburied excess hoses;
rig floor at 0.0m (reference)
top of ice at 0.6m
bottom of ice at >1.7m
lake bottom at 3.3m

1420 casing drilled butter to 4.2m; barely a crunch
drilled about 0.6m beyond casing, during which casing sank under own weight to below rig floor; pulled rods

1630 casing encountered rock at 5.7m (bedrock)

1700 advanced casing to 6.1m, adjusted casing lengths to install cuttings catcher below rig floor

1900 at 8.7m

NS 23/02/2004

1920hrs problems with oil pump/cooler on motor? No oil pressure; drain hoses to avoid freezing; motor of drill had to be started with battery

2040hrs put hoses back, still not working: one oil line to cooler was leaking therefore not enough oil (absorbed in mats, no spill); snow inside of envirotank, so line might be frozen; try to change tank; fuel filter with primer to be changed

0045hrs start drilling

0145hrs at 11.7m

0300hrs packer test 1 completed, packer out of hole

0400hrs at 14.7m

0515hrs packer test 2 completed, packer out of hole

0615hrs add oil to motor, get ready for packer test 3

0630hrs packer test 3 started

0705hrs packer finished

DS 24/02/2004

0830 at 20.7m

0930 packer test 4 complete

1030 at 23.7m

1120 END OF HOLE AT 26.2m; bit worn out

1220 final packer complete
reflex
grouted
staked

Checklist (delete after file is complete, before printing)

summary updated?
point load test samples selected?

SRK Consulting
Engineers and Scientists

FIELD DRILL PERFORMANCE LOG

PROJECT	**Gahcho Kue Geotech**
PROJECT NO	**2CD002.11**
NORTHING	7035468.6
EASTING	588865
SURFACE ELEVATION	404
AZIMUTH	0
DIP	90

HOLE NO:	**MPV-04-146c**
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	02/23/2004 1:00
FINISH DATE AND TIME	02/24/2004 13:00
HOLE DIAMETER	47.6 (NQ)
DRILLING METHOD	Diamond core

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
NS 1900-0700	B Rameseder	22/02/2004					hole MPV-04-146C spotted (2m from original site; ice > 42 inches thick), move to hole MPV-04-146C started	0	0	0.00	0	0	0	0.00
DS 0700-1900	R Bowden	23/02/2004	1900hrs	12	7	8.70	completed move; shortened hoses; attached piston bandaid	8.7	5	1.74	12	7	5	1.74
NS 1900-0700	B Rameseder	23/02/2004		12	9	17.70	repairs at drill (oil line to cooler, tank change, fuel filter with primer changed), 3	9	3	3.00	24	16	8	2.21
DS 0700-1900	R Bowden	24/02/2004		12	6	26.20	reflex, packers, packed and moved	8.5	6	1.42	36	22	14	1.87

OVERALL HOLE DRILL RATE (m/hr)	0.73
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	1.87

GENERAL GEOTECH LOG

DRILLHOLE ID: **MPV-04-146c**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
5.70	6.15	0.45	BGRN	0.43	95.6	0.40	88.9	0.40	88.9	Bedrock at 5.7m. BGRN: biotite rich granite with pegmatitic sections; 45cm of **mechanically** broken rock: 2-10cm pieces
6.15	8.70	2.55	BGRN	2.51	98.4	2.51	98.4	2.51	98.4	
8.70	11.70	3.00	BGRN	2.96	98.7	2.92	97.3	2.92	97.3	
11.70	14.70	3.00	BGRN	3.10	103.3	3.10	103.3	3.10	103.3	broken due to mechanical influence probably on weak microdefects or due to high content of mica
14.70	17.70	3.00	BGRN	3.00	100.0	3.00	100.0	3.00	100.0	
17.70	20.70	3.00	BGRN	3.00	100.0	3.00	100.0	3.00	100.0	
20.70	23.70	3.00	BGRN	3.00	100.0	3.00	100.0	3.00	100.0	
23.70	26.20	2.50	BGRN	2.50	100.0	2.47	98.8	2.36	94.4	**END OF HOLE**
		0.00								
		0.00								
		0.00								
		0.00								
		0.00								
		0.00								
		0.00								
		0.00								
		0.00								
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DETAILED GEOTECHNICAL LOG DRILLHOLE ID: **MPV-04-146c**

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

FROM	TO	ROCK	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of			JOINT CONDITIONS				COMMENT
(m)	(m)	TYPE	STRONG R	WEAK R	% WEAK	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH	Sets	Type	Totals	ANGLE	ROUGH	ALT	FILL	
5.7	6.2	**BGRN**																		BGRN: biotite rich granite with pegmatitic sections; broken by drillir
6.2	8.7	**BGRN**	R5	R4	40	30	0	7	2	1	1	1	3	J1	3	65	2	0	2	
														J2	3	15	4	1	9	
														J3	1	35	5	0	9	Joint set 1: calcite and hematite on joints; Joint set 2: wall of joint wa
8.7	11.7	**BGRN**	R5	R4	35	25	0	5	1	1	1	0	3	J1	1	60	7	0	2	
														J2	1	75	5	0	9	
														J3	3	80	7	0	2	Joint set 1 and 2: calcite and hematite coatin
11.7	14.7	**BGRN**	R5	R4	35	26	0	6	1	1	2	1	3	J1	4	80	5	0	3	
														J2	1	65	7	0	3	
														J3	1	15	4	0	9	Joint set 1 and 2: calcite and hematite coating; some chlorite
14.7	17.7	**BGRN**	R4		0	24	0	5	0	0	0	0	2	J1	4	85	7	0	9	
														J2	1	45	5	0	9	
																				J2 has coating of calcite (?
17.7	20.7	**BGRN**	R4		0	21	0	4	0	0	0	0		J1	2	78	7	0	9	
														J2	1	85	7	0	9	
														J3	1	40	4	0	9	J1 and J2 have thin calcite coatin
20.7	23.7	**BGRN**	R4		0	16	0	6	0	0	0	0		J1	2	85	5	0	9	
														J2	1	80	4	0	9	
														J3	2		4	0	9	J1 and J2 have calcite coatings; J3 at 40 and 90 with hematite stai
23.7	26.2	**BGRN**	R4		0	22	0	11	0	0	1	0		J1	4	85	5	0	9	
														J2	3	55	5	0	9	
														J3	3	70	5	0	9	J1 condition varies from 2 to 8. Thin grey coating (calcite
	END OF HOLE																			

Photo Record

MPV-04-146c

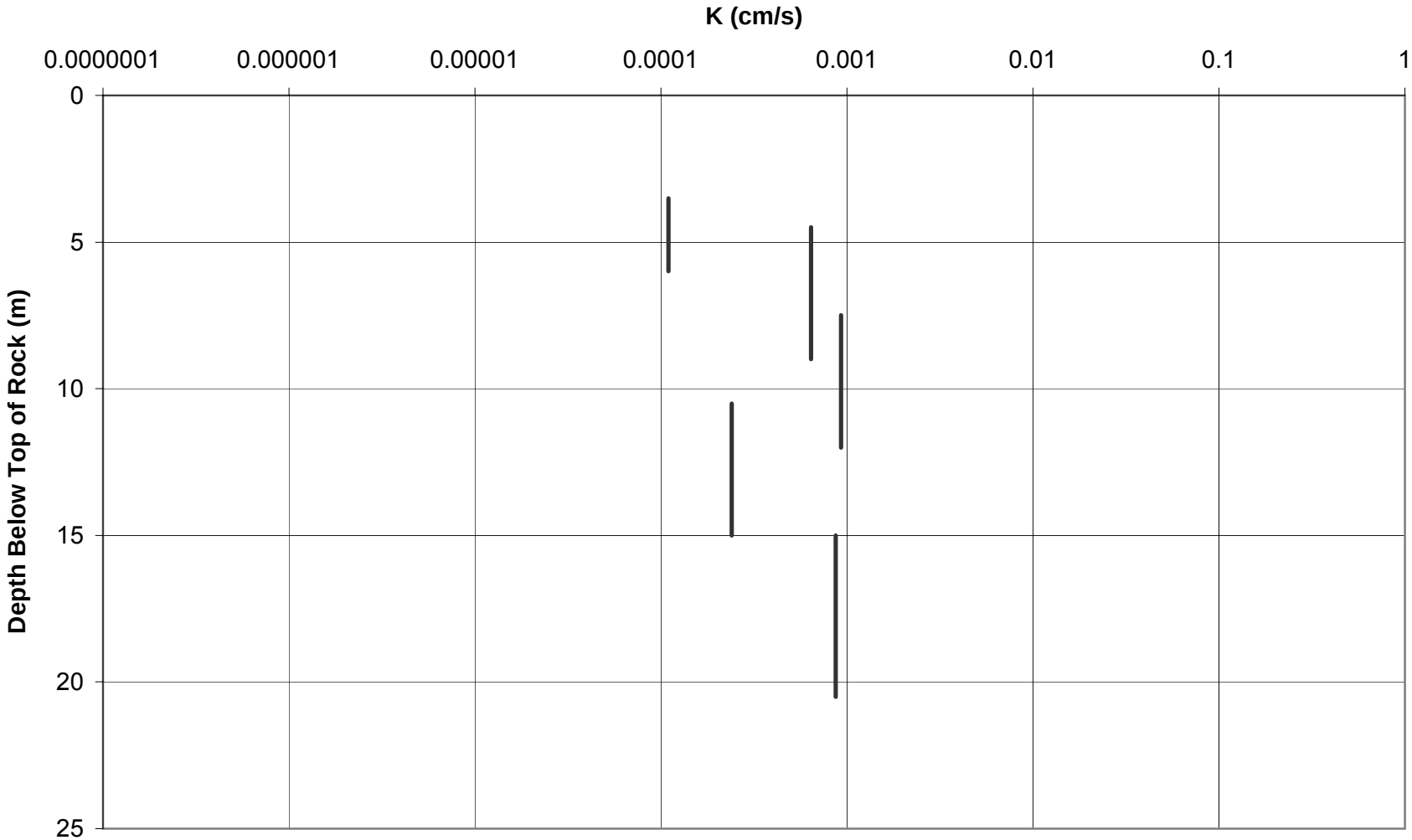
Date	Shift	Filename	Depth	Description
23/02/2004	NS 1900-0700	MPV-04-146c-5.7m-Box1-dry	5.7-10.1	biotite rich granite, pegmatitic
23/02/2004	NS 1900-0700	MPV-04-146c-10.10m-Box2-dry	10.10-14.32	biotite rich granite, pegmatitic
24/02/2004	DS 0700-1900	MPV-04-146c-14.32m-Box3-dry	14.32 - 18.6	biotite rich granite, pegmatitic
24/02/2004	DS 0700-1900	MPV-04-146c-18.6m-Box4-dry	18.6 - 22.9	biotite rich granite, pegmatitic
24/02/2004	DS 0700-1900	MPV-04-146c-22.9m-Box5-dry	22.9 - 26.2	biotite rich granite, pegmatitic

Core Box Record

MPV-04-146c

Box	From	To	Comments
1	5.70	10.10	biotite rich granite, pegmatitic
2	10.10	14.32	biotite rich granite, pegmatitic
3	14.32	18.60	biotite rich granite, pegmatitic
4	18.60	22.90	biotite rich granite, pegmatitic
5	22.90	26.20	biotite rich granite, pegmatitic
	26.20		**END OF HOLE**

Permeability vs Depth
MPV_04_146C



Packer Test Data

Date	23-02-2004
Staff	B. Rameseder, R. Bowden
Init. WL:	
Ref. Pt.	rig floor
Dip	90

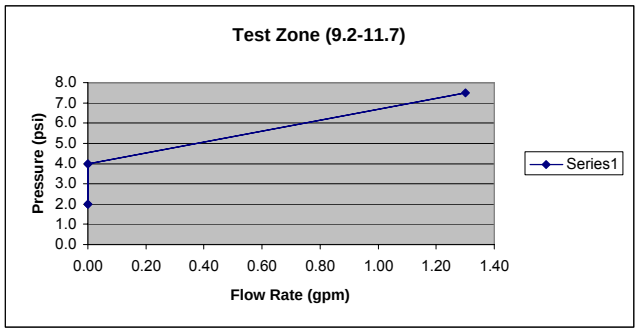
MPV-04-146c

Test 1 9.2 11.7

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments
1	0	3404.50		2.0	**no leaks**
	1	3404.50	0.00		
	2	3404.50	0.00		
	3	3404.50	0.00		
	4	3404.50	0.00		
2	0	3404.20		4.0	**no leaks**
	1	3404.50	0.30		knocked on gage
	2	3404.50	0.00		
	3	3404.50	0.00		
	4	3404.50	0.00		
3	0	3405.80		7.5	**no leaks**
	1	3407.10	1.30		
	2	3408.30	1.20		
	3	3409.60	1.30		
	4	3410.80	1.20		
	5	3412.10	1.30		
	6	3413.50	1.40		
	7	3414.8	1.30		
4	0	3415.00		4.0	**no leaks**
	1	3415.00	0.00		
	2	3415.00	0.00		
	3	3415.00	0.00		
	4	3415.00	0.00		
5	0	3415.00		2.0	**no leaks**
	1	3415.00	0.00		
	2	3415.00	0.00		
	3	3415.00	0.00		
	4	3415.00	0.00		

Summary

Flow rate (gpm)
0.00
0.00
1.30
0.00
0.00



Test 2 10.2 14.7

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments

Summary

Permeability Summary

MPV-04-146C

from	to		Step 1	Step 2	Step 3	Step 4	Step 5	Avg K
9.2	11.7	gauge (psi)	2	4	7.5	4	2	
		Qavg (igpm)	0	0	1.3	0	0	
		K cm/sec	**0.0E+00**	**0.0E+00**	**5.5E-04**	**0.0E+00**	**0.0E+00**	1.1E-04
10.2	14.7	gauge (psi)	3	7.5	10	7	3.5	
		Qavg (igpm)	0	3.6	4.6	3.4	1.4	
		K cm/sec	**0.0E+00**	**8.5E-04**	**8.1E-04**	**8.6E-04**	**7.1E-04**	6.4E-04
13.2	17.7	gauge (psi)	5.5	10.5	15	10.5	5	
		Qavg (igpm)	3	5.1	6.6	5.5	3.2	
		K cm/sec	**9.6E-04**	**8.6E-04**	**7.8E-04**	**9.2E-04**	**1.1E-03**	9.3E-04
16.2	20.7	gauge (psi)	9.5	16	20.5	13.5	8	
		Qavg (igpm)	1.3	2.1	2.6	1.8	1.1	
		K cm/sec	**2.4E-04**	**2.3E-04**	**2.2E-04**	**2.4E-04**	**2.4E-04**	2.4E-04
20.7	26.2	gauge (psi)	10.5	17	21.5	15	8.5	
		Qavg (igpm)	6.7	9.1	10.1	8.6	6.7	
		K cm/sec	**9.2E-04**	**7.7E-04**	**6.8E-04**	**8.3E-04**	**1.1E-03**	8.7E-04
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	

Equations:

$Hf = 8.65x10^{-15} (Q^2 * Lp/rp^5)$

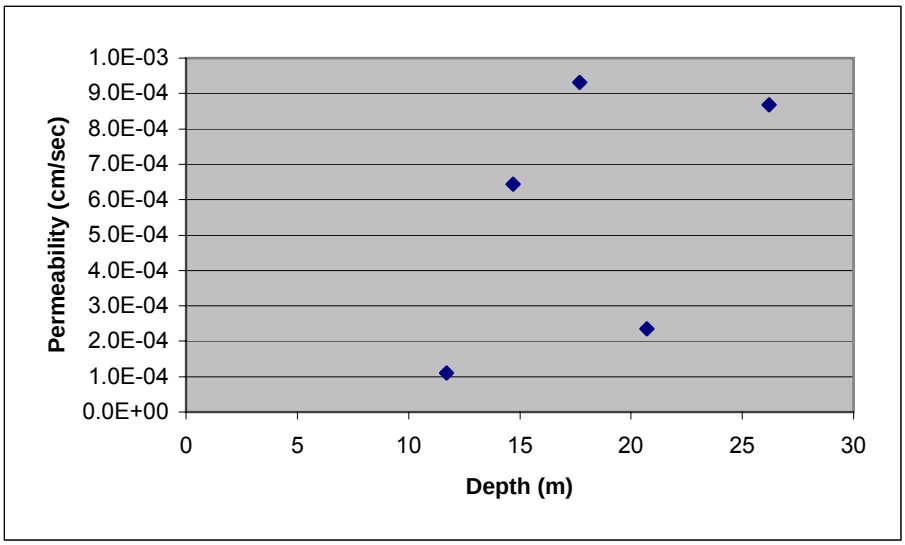
$H_{nit} = (Dw' + Hg - Hf) + Pg/1.42$

$K = (Q * Ln(R/r_b))/2 * \pi * H_{nit} * L)$

Overall 5.6E-04 cm/sec

assume
- vertical drillhole
- water at ground surface
- height of gauge is at rig flr
- negligible friction losses

Dw	Measured depth of static water (**1**)	*0*	m
Dp	Measured depth to packer		m
Dt	Depth to midpoint of test		m
Inc	Inclination from horizontal	*90*	m
Dw'	Vertical depth to static water level		°
Dp'	Vertical depth to packer		m
Dt'	Vertical depth to midpoint of test		m
Hg	Gauge height	*0*	m
Lp	Length of discharge pipe		m
rp	Radius of discharge pipe (1" = 0.0127m)		m
R	Radius of influence (10m is standard)	10	m
rb	Drillhole radius (HQ=0.048m, NQ=0.038m)	0.038	m
L	Length of test section		m
Hf		0	m



Reflex Readings **MPV-04-146C**

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Field	Temp ©
24-Feb-04	26.2	159.6	88.7	31.3	5899	11.2

FIELD GEOLOGICAL LOG

HOLE ID MPV-04-146c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	3.30	Ice/Water	n/a	>1.7m ice, to 3.3m water	RB/BR
3.30	5.70	Overburden	n/a	Overburden	RB/BR
5.70	26.20	Granite	n/a	Biotite rich granite with pegmatitic sections	RB/BR
EOH					

POINT LOAD TEST - INPUT

DRILL HOLE ID: MPV-04-146C

No. #	DATE	HOLE/ FACE ID	DIST. (m)	ROCK TYPE	TEST TYPE	TESTED BY	DAYS	W (mm)	D (mm)	P (kN)	COMMENT
1	##########	MPV-04-146C	23.79	Granite	1	John Delgaty			48.10	8.04	Coarse white/pink granite - nice clean breaks
2	##########	MPV-04-146C	to	Granite	1	John Delgaty			48.10	9.48	Coarse white/pink granite - nice clean breaks
3	##########	MPV-04-146C	24.22	Granite	1	John Delgaty			48.10	15.87	Coarse white/pink granite - nice clean breaks
1	##########	MPV-04-146C	24.53	Granite	1	John Delgaty			48.10	19.23	Coarse white/pink granite - nice clean breaks
2	##########	MPV-04-146C	to	Granite	1	John Delgaty			48.10	25.03	Coarse white/pink granite - nice clean breaks
3	##########	MPV-04-146C	25.77	Granite	1	John Delgaty			48.10	23.02	Coarse white/pink granite - nice clean breaks

UCS SAMPLES

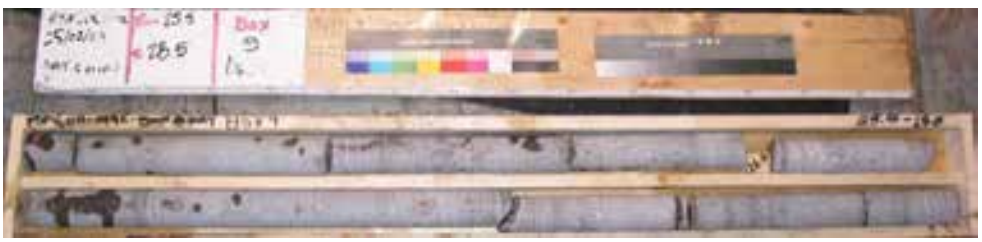
HOLE ID: MPV-04-146C

HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-146C	5	24.22-24.53	Granite	04-UCS-146-001

MPV_04_146C

MPV_04_147C

MPV_04_147C



Diary

MPV-04-147c

DS 2/02/2004

1500hrs	start move from MPV-04-16 to MPV-04-147C

NS 25/02/2004

0030hrs	finished set-up; repair roof of drill
0415hrs	casing finished, very hard ground (boulders); 3m of casing are 2.4m in ground
	rig floor st 0.0m (reference point) snow at 0.7m ground surface at 1.7m casing set at 3.2m
0500hrs	fuel person drives with fuel sled on leg of drill, leg is displaced; check leg and tower
0530hrs	continue drilling to 5.6m Note: rock seems to have large fractures: no water return, problems when drilling ("empty spaces")

DS 25/02/2004

0700	at 5.6m, no return
0810	at 8.6m changed bit at 9.4m
0940	at 11.6m
1120	at 17.6m
11:30	Hydraulic fluid leak. Drill shut down for repairs.
11:40	Hydraulic leak repaired. Drill restarted.
12:30	at 22.5 m
14:20	
15:09	at 30.7 EOH reflex test
1635	thermistor installed protective pipe impeded by cave and pvc stick-up; pvc shortened and protective pipe
1710	installed in the evening

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Engineers and Scientists

FIELD DRILL PERFORMANCE LOG

PROJECT	**Gahcho Kue Geotech**
PROJECT NO	**2CD002.11**
NORTHING	7035235
EASTING	588408
SURFACE ELEVATION	404.37
AZIMUTH	267
DIP	-70

HOLE NO:	**MPV-04-147c**
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	24/02/2004 13:00:00 PM
FINISH DATE AND TIME	25/02/2004 16:00:00 PM
HOLE DIAMETER	63.5 (HQ)
DRILLING METHOD	Diamond core

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
DS 0700-1900	R Bowden	24/02/2004		6	6	0	move to MPV-04-147C	0	0	0.00	0	0	0	0.00
NS 1900-0700	B Rameseder	24/02/2004		12	7.15	5.60	complete set-up, casing set to	5.6	4.85	1.15	12	7.15	4.85	1.15
DS 0700-1900	M Story	25/02/2004		12	4	30.70	finished at 3pm, packed up	25.1	8	3.14	24	11.15	12.85	2.39

OVERALL HOLE DRILL RATE (m/hr)	1.02
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	2.39

GENERAL GEOTECH LOG

DRILLHOLE ID: **MPV-04-147c**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
0.00	1.70	1.70	snow/ice							
1.70	2.80	1.10	OVB							
2.80	5.60	2.80	GRN	2.80	100.0	2.55	91.1	2.55	91.1	BEDROCK at 2.8m; recovery is for bedrock only; GRN is biotite granite
5.60	8.60	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
8.60	9.50	0.90	GRN	0.90	100.0	0.90	100.0	0.90	100.0	
9.50	11.60	2.10	GRN	2.10	100.0	2.10	100.0	2.03	96.7	
11.60	14.60	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
14.60	17.60	3.00	GRN	3.00	100.0	3.00	100.0	2.97	99.0	
17.60	20.60	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
20.60	23.60	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
23.60	26.60	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
26.60	29.60	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
29.60	30.70	1.10	GRN	1.10	100.0	1.10	100.0	1.10	100.0	END OF HOLE
		0.00								
		0.00								
		0.00								
		0.00								
		0.00								
		0.00								
		0.00								
		0.00								
		0.00								
		0.00								
		0.00								
		0.00								
		0.00								

DETAILED GEOTECHNICAL LOG

DRILLHOLE ID: MPV-04-147c

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

FROM	TO	ROCK	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of			JOINT CONDITIONS				COMMENT
(m)	(m)	TYPE	STRONG R	WEAK R	% WEAK	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH	Sets	Type	Totals	ANGLE	ROUGH	ALT	FILL	
2.8	5.6	**GRN**	R5		0	27	0	8	0	0	0	0	2	J1	2	45	5	0	9	Broken weathered zone at 3.7-3.9 approx; most joints in run are weathered and have silt dusting; various angles 20, 35, 60, 85
														J2	6		4	0	9	
5.6	8.6	**GRN**	R5		0	8	0	2	0	0	0	0	1	J1	2	70	4	0	9	One J1 has substantial hematite staining
8.6	9.5	**GRN**	R6		0	3	0	0	0	0	0	0								No natural joints.
9.5	11.6	**GRN**	R6		0	8	0	5	0	0	0	0	3	J1	3	75	7			J1 has thin coating of calcite.
														J2	1	65	4	0	9	
														J3	1	80	4	0	9	
11.6	14.6	**GRN**	R6		0	6	0	3	0	0	0	0	1	J1	3	65	5	0	9	
14.6	17.6	**GRN**	R6		0	11	0	3	0	0	0	0	2	J1	2	40	4	0	9	J1 has continuous calcite coating. Other had a silt coating.
														J2	1	70	5	0	9	
17.6	20.6	**GRN**	R6		0	11		3	0	0	0	0	2	J1	2	45	4			one J1 had mica plane of weakness. J2 has trace silt coating
														J2	1	65	5	0	9	
20.6	23.6	**GRN**	R5		0	10	0	1	0	0	0	0	1	J1	1	70	4			Partial thin silt coating
23.6	26.6	**GRN**	R5		0	12	0	0	0	0	0	0								No natural joints.
26.6	29.6	**GRN**	R6		0	8	0	0	0	0	0	0								No natural joints
29.6	30.7	**GRN**	R6		0	2	0	1	0	0	0	0	1	J1	1	60	5	0		Partial thin silt coating; hematite stain END OF HOLE

Photo Record

MPV-04-147c

Date	Shift	Filename	Depth	Description
25/02/2004	DS 0700-1900	MPV-04-147c-0.70m-Box1-dry	0.70 - 5.1m	OVB an granite bedrock
25/02/2004	DS 0700-1900	MPV-04-147c-5.1m-Box2-dry	5.1 - 8.1m	granite
25/02/2004	DS 0700-1900	MPV-04-147c-8.1-Box3-dry	8.1 - 10.93m	granite
25/02/2004	DS 0700-1900	MPV-04-147c-10.93-Box4-dry	10.93 - 13.80m	granite
25/02/2004	DS 0700-1900	MPV-04-147c-13.8-Box5-dry	13.8-16.8	granite
25/02/2004	DS 0700-1900	MPV-04-147c-16.8-Box6-dry	16.8 - 19.6	granite
25/02/2004	DS 0700-1900	MPV-04-147c-19.6-Box7-dry	19.6 - 22.52	granite
25/02/2004	DS 0700-1900	MPV-04-147c-22.5-Box8-dry	22.5 - 25.5	granite
25/02/2004	DS 0700-1900	MPV-04-147c-25.5-Box9-dry	25.5 - 28.5	granite
25/02/2004	DS 0700-1900	MPV-04-147c-28.5-Box10-dry	28.5 -30.7	granite

Core Box Record

MPV-04-147c

Box	From	To	Comments
1	0.70	5.10	overburden and granite
2	5.10	8.10	granite
3	8.10	10.93	granite
4	10.93	13.80	granite
5	13.80	16.70	granite
6	16.70	19.60	granite
7	19.60	22.50	granite
8	22.50	25.50	granite
9	25.50	28.50	granite
10	28.50	30.70	granite
11	EOH		
12			

Thermistor Readings

MPV-04-147c

Thermistor String ID **32/16- 5**

Thermis Node	Reading (kOhms)	Comments
1	16.20	
2	16.15	
3	15.73	
4	15.64	
5	16.23	
6	15.95	
7	15.74	
8	16.10	
9	15.81	
10	16.14	
11	15.59	
12	15.73	
13	16.13	
14	16.06	
15	15.66	
16	16.24	

Reflex Readings **MPV-04-147C**

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Field	Temp ©
25-Feb-04	30.7	248.6	69.3	244.3	5943	8.7

FIELD GEOLOGICAL LOG

HOLE ID MPV-04-147c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	1.70	ice/snow	n/a	ice/snow	MS
1.7	2.8	Overburden	n/a	Overburden	MS
2.80	30.70	Granite	n/a	Granite, compact, some fractures, reddish as hematite stained, coarse grained, biotite rich	MS
EOH					MS

UCS SAMPLES

HOLE ID: MPV-04-147C

HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-147C	10	29.13-29.41	Granite	04-UCS-147-001

POINT LOAD TEST - INPUT

DRILL HOLE ID: MPV-04-147C

No. #	Tested by	DATE	HOLE/ FACE ID	DIST. (m)	ROCK TYPE	TEST TYPE	ORINT	DAYS	W (mm)	D (mm)	P (kN)	COMMENT
1	John Delgaty	##############	MPV-04-147C	28.94	Granite	1				61.00	16.02	Medium grained pink granite - a good clean break
2	John Delgaty	##############	MPV-04-147C	to	Granite	1				61.00	24.74	Medium grained pink granite - a good clean break
3	John Delgaty	##############	MPV-04-147C	29.13	Granite	1				61.00	28.03	Medium grained pink granite - a good clean break
1	John Delgaty	##############	MPV-04-147C	29.41	Granite	1				61.00	26.25	Medium grained pink granite - a good clean break
2	John Delgaty	##############	MPV-04-147C	to	Granite	1				61.00	16.14	Medium grained pink granite - a good clean break
3	John Delgaty	##############	MPV-04-147C	29.57	Granite	1				61.00	25.48	Medium grained pink granite - a good clean break

GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH

	CATEGORY	DESCRIPTION	Mpa
R0	EXTREMELY WEAK ROCK	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	VERY WEAK ROCK	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	WEAK ROCK	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	MEDIUM STRONG ROCK	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	STRONG ROCK	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	VERY STRONG ROCK	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	EXTREMELY STRONG ROCK	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY

CODE	DESCRIPTION
0	NONE
1	MINOR
2	MODERATE
3	HEAVY

DROP TEST - CEMENTED JOINTS/DEFECTS

CODE	CATEGORY
0	STRONG (NEVER BREAKS)
1	MODERATE (SOMETIMES BREAKS)
3	WEAK (ALWAYS BREAKS)

JOINT CONDITION - SMALL SCALE

CODE	CATEGORY	SUBCATEGORY
1	STEPPED	ROUGH
2		SMOOTH
3		SLICKENSIDED
4	UNDULATING	ROUGH
5		SMOOTH
6		SLICKENSIDED
7	PLANAR	ROUGH
8		SMOOTH
9		SLICKENSIDED

JOINT FILLING

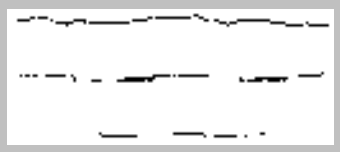
CODE	CATEGORY	SUBCATEGORY
1	NON	COARSE
2	SOFTENING	MEDIUM
3		FINE
4	SOFT	COARSE
5	SHEARED	MEDIUM
6		FINE
7	GOUGE THIKNESS < IRREGULARITIES	
8	GOUGE THIKNESS > IRREGULARITIES	
9	NO INFILL	

JOINT ALTERATION

CODE	DESCRIPTION
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

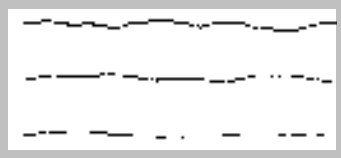
JOINT CONDITIONS - SMALL SCALE

	Laubscher	Jr	JRC
ROUGH	1	4	20
SMOOTH	2	3	14
SLICKEN-SIDED	3	2	11



STEPPED

ROUGH	4	3	14
SMOOTH	5	2	11
SLICKEN-SIDED	6	1.5	7

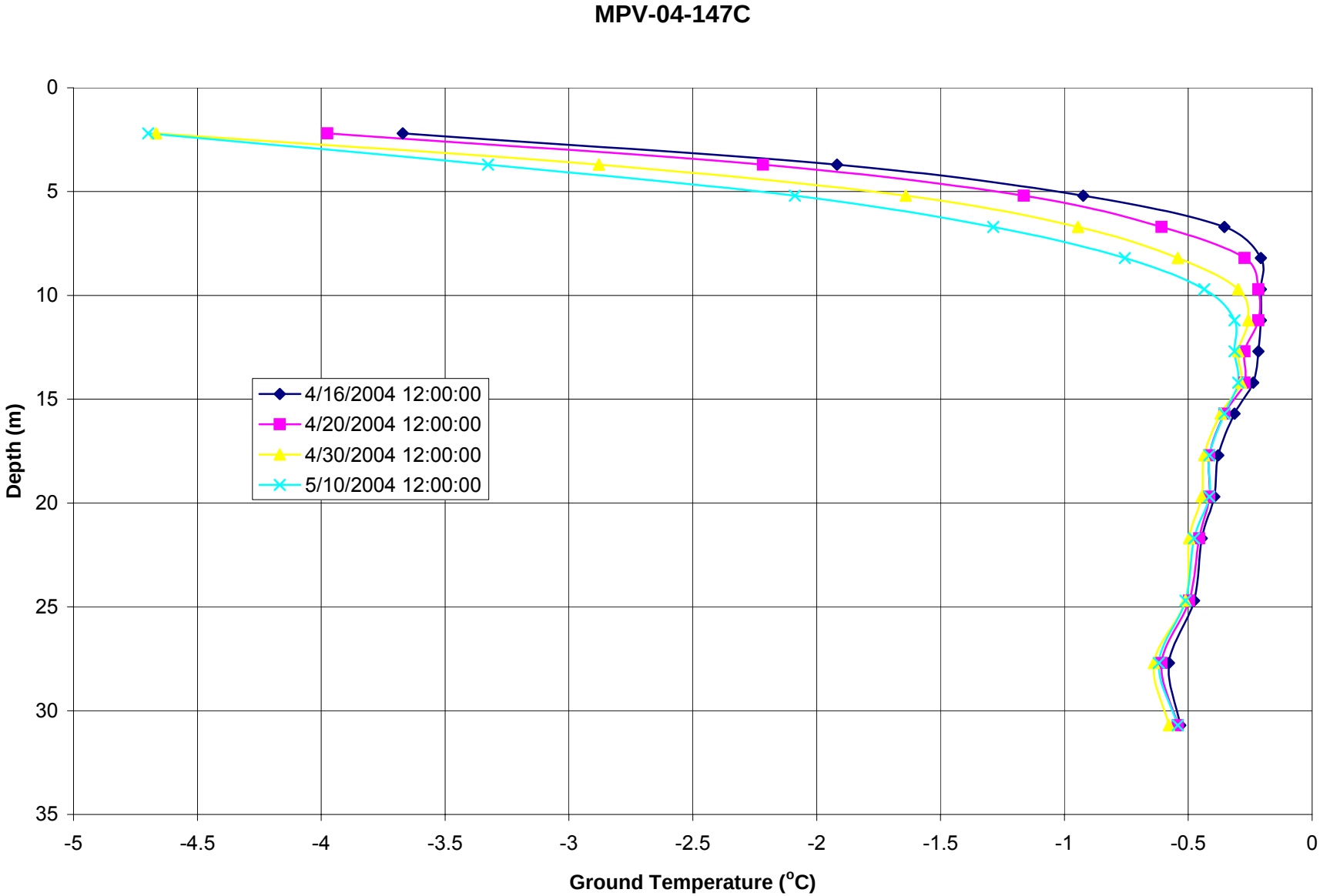


UNDULATING

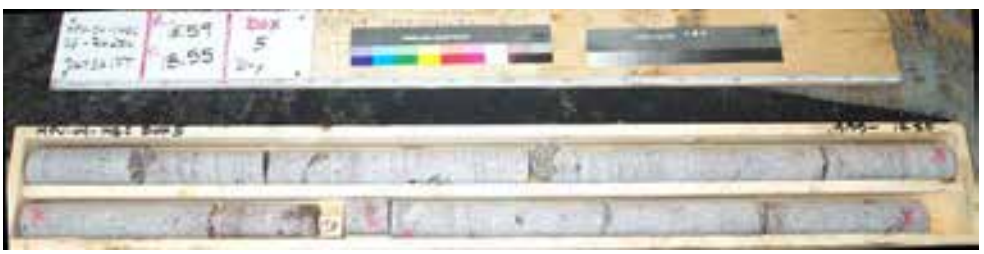
ROUGH	7	1.5	2.5
SMOOTH	8	2	1.5
SLICKEN-SIDED	9	0.5	0.5

PLANAR

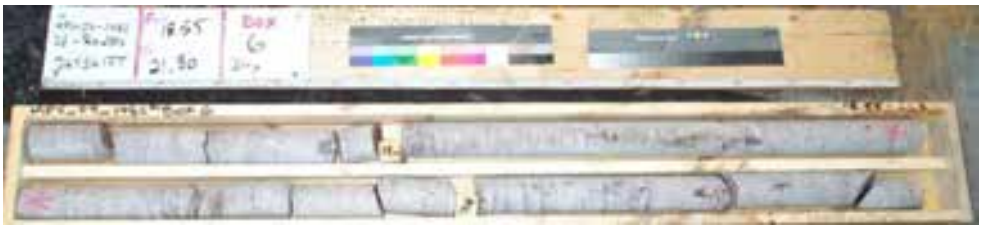
SRK STEFFEN, ROBERTSON AND KIRSTEN
Consulting Engineers

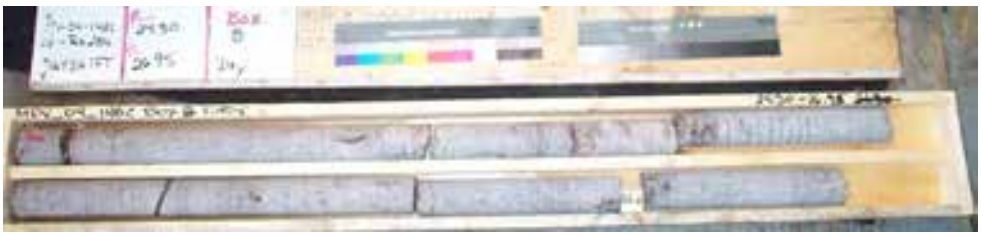

MPV-04-147C
Depth (m)
0
5
10
15
20
25
30
35
-5
-4.5
-4
-3.5
-3
-2.5
-2
-1.5
-1
-0.5
0
Ground Temperature (°C)
4/16/2004 12:00:00
4/20/2004 12:00:00
4/30/2004 12:00:00
5/10/2004 12:00:00

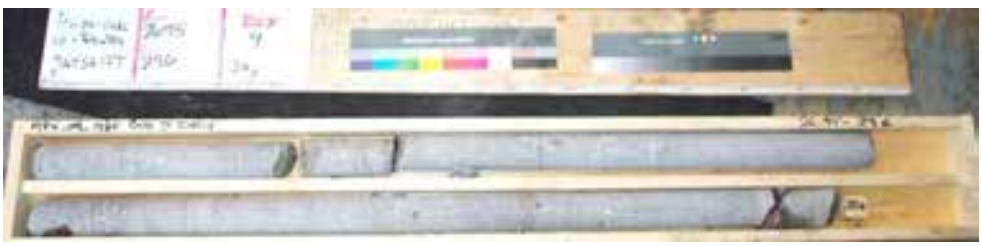
MPV_04_148C



MPV_04_148C







Diary

MPV-04-148c

NS 25/02/2004

	set-up finished, started casing; helper is
2300hrs	sick, driller is working with foreman
0100hrs	foreman has to leave; stop casing
0130hrs	continue casing
	at 5.6m (to 4.5m casing), problem with lock
0300hrs	at core barrel
0330hrs	continue drilling
	rig floor as reference point (0.0m)
	snow at 0.7m
	ground surface at 1.5m
	casing set to 4.5m
	pump below rig floor plugged up with sand
0430hrs	at 8.6m
0545hrs	at 11.6m
	check oil at pumps and drill

DS 26/02/2004

0830hrs	at 14.6 m
0100hrs	change drill bit
1015hrs	recommence drilling
1030hrs	at 19 m
1300hrs	at 26.6m
1450hr	at 31.5 m . EOH
1510hr	Thermister installed in hole.

SRK Consulting
Engineers and Scientists

FIELD DRILL PERFORMANCE LOG

PROJECT	**Gahcho Kue Geotech**
PROJECT NO	**2CD002.11**
NORTHING	7035232
EASTING	588387
SURFACE ELEVATION	404
AZIMUTH	267
DIP	-70

HOLE NO:	**MPV-04-148c**
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	25/02/2004 19:00
FINISH DATE AND TIME	26/02/2004 15:00
HOLE DIAMETER	63.5 (HQ)
DRILLING METHOD	Diamond core

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
NS 1900-0700	B Rameseder	25/02/2004		12	7.15	11.6	set-up at hole, foreman has to replace helper (sick), some short delays due to work on other drills; casing to 4.5m	11.6	4.85	2.39	12	7.15	4.85	2.39
DS 0700-1900	M Story	25/02/2004		12	4.1	31.50	15 minutes down time to change drill bit. EOH; install thermistor; start move	19.9	7.90	2.52	24.00	11.25	12.75	2.47

OVERALL HOLE DRILL RATE (m/hr)	1.31
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	2.47

GENERAL GEOTECH LOG

DRILLHOLE ID: **MPV-04-148c**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
4.50	4.85	0.35	OVB							OVB: overburden consisting of boulders and cobbles of different lithologies eg
4.85	5.60	0.75	GRN	0.74	98.7	0.74	98.7	0.74	98.7	GRN: granite
5.60	8.60	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
8.60	11.60	3.00	GRN	3.01	100.3	3.01	100.3	3.01	100.3	
11.60	14.60	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
14.60	17.60	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
17.60	19.00	1.40	GRN	1.40	100.0	1.40	100.0	1.40	100.0	Drill bit changed between 17.6 and 19.0
19.00	20.60	1.60	GRN	1.60	100.0	1.60	100.0	1.60	100.0	
20.60	23.60	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
23.60	26.60	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
26.60	29.60	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	No return water between 26.60 and 29.60 m depth.
29.60	31.50	1.90	GRN	1.90	100.0	1.90	100.0	1.90	100.0	greater Quartz content; **EOH**
		0.00								

DETAILED GEOTECHNICAL LOG

DRILLHOLE ID: **MPV-04-148c**

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

FROM	TO	ROCK	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of			JOINT CONDITIONS				COMMENT
(m)	(m)	TYPE	STRONG R	WEAK R	% WEAK	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH	Sets	Type	Totals	ANGLE	ROUGH	ALT	FILL	
4.9	5.6	GRN	R5		0	2	0	0	0		0									
5.6	8.6	GRN	R5		0	12	0	2	0		0		1	J1	2	65	2	0	9	
8.6	11.6	GRN	R5		0	10	0	1	0		0		1	J1	1	62	5	0	9	machine breaks
11.6	14.6	GRN	R5		0	11	0	0	0		0									machine breaks
14.6	17.6	GRN	R6		0	9	0	1	0		0		1	J1	1	60	5	0	9	
17.6	19.0	GRN	R6		0	5	0	0	0		0									machine breaks
19.0	20.6	GRN	R6		0	3	0	0	0		0									machine breaks
20.6	23.6	GRN	R6		0	12	0	1	0		0			J1	1	45	8	0	9	
23.6	26.6	GRN	R6		0	6	0	0	0		0									
26.6	29.6	GRN	R5		0	4	0	3	0		0			J1	2	70	4	0	9	
														J2	1	70	2	0	9	Thin silt coating on J1. Small spec of mica-like material at J:
29.6	31.5	GRN	R4		0	6	0	3	0		0			J1	1	70	5	0	9	
														J2	1	80	5	0	9	
														J3	1	75	5	0	9	

Photo Record

MPV-04-148c

Date	Shift	Filename	Depth	Description
25/02/2004	NS 1900-0700	MPV-04-148c-4.5m-Box1-dry	4.5-7.25	Overburden/ granite
25/02/2004	NS 1900-0700	MPV-04-148c-7.25m-Box2-dry	7.25-10.0	Granite
25/02/2004	DS 0700-1900	MPV-04-148c-10.0m-Box3-dry	10.0 - 12.7	Granite
25/02/2004	DS 0700-1900	MPV-04-148c-12.7m-Box4-dry	12.7-15.59	Granite
25/02/2004	DS 0700-1900	MPV-04-148c-15.59m-Box5-dry	15.99 - 18.55	Granite
25/02/2004	DS 0700-1900	MPV-04-148c-18.55m-Box6-dry	18.55 - 21.30	Granite
25/02/2004	DS 0700-1900	MPV-04-148c-21.30m-Box7-dry	21.30 - 24.3	Granite
25/02/2004	DS 0700-1900	MPV-04-148c-24.30m-Box8-dry	24.3 - 26.95	Granite
25/02/2004	DS 0700-1900	MPV-04-148c-26.95m-Box9-dry	26.95 - 29.6	Granite
25/02/2004	DS 0700-1900	MPV-04-148c-29.5m-Box10-dry	26.95 - 29.6	Granite

Core Box Record

MPV-04-148c

Box	From	To	Comments
1	4.50	7.25	
2	7.25	10.00	
3	10.00	12.70	
4	12.70	15.59	
5	15.59	18.55	
6	18.55	21.30	
7	21.30	24.30	
8	24.30	26.95	
9	26.95	29.60	
10	29.60	31.50	End of Hole
11			
12			

Thermistor Readings

MPV-04-148c

Thermistor String ID **32/16-4**

Thermis Node	Reading (kOhms)	Comments
1	12.40	
2	12.76	
3	13.30	
4	14.44	
5	15.22	
6	14.56	
7	13.65	
8	12.77	
9	14.95	
10	15.68	
11	14.42	
12	13.17	
13	15.44	
14	13.75	
15	15.20	
16	12.95	

Reflex Readings **MPV-04-148C**

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N	Magnetic Field	Temp ©
26-Feb-04	31.5	251.1	67.5	22.2	5948	13.9

FIELD GEOLOGICAL LOG

HOLE ID MPV-04-148c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	1.50	snow/ice		snow/ice	BR
1.5	4.85	Overburden		Overburden consisting of boulders and cobbles of different lithologies eg different types of granite (pink, red or grey), gneiss, schist and ultramafics	BR
4.85	31.50	Granite		Very compact granite; coarse grained, reddish-black colour, biotite rich	BR

UCS SAMPLES

HOLE ID: MPV-04-148C

HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-148C	6	19.91-20.17	Granite	04-UCS-148-001

POINT LOAD TEST - INPUT

DRILL HOLE ID: MPV-04-148C

No. #	Tested by	DATE	HOLE/ FACE ID	DIST. (m)	ROCK TYPE	TEST TYPE	ORINT	DAYS	W (mm)	D (mm)	P (kN)	COMMENT
1	John Delgaty	##########	MPV-04-148C	19.40	granite	1				61.15	23.39	Medium to coarse grained pink granite - good clean break
2	John Delgaty	##########	MPV-04-148C	to	granite	1				61.15	23.07	Medium to coarse grained pink granite - good clean break
3	John Delgaty	##########	MPV-04-148C	19.91	granite	1				61.15	35.77	Medium to coarse grained pink granite - good clean break
1	John Delgaty	##########	MPV-04-148C	20.17	granite	1				61.15	22.67	Medium to coarse grained pink granite - good clean break
2	John Delgaty	##########	MPV-04-148C	to	granite	1				61.15	15.16	Medium to coarse grained pink granite - good clean break
3	John Delgaty	##########	MPV-04-148C	20.53	granite	1				61.15	22.35	Medium to coarse grained pink granite - good clean break

GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH

	CATEGORY	DESCRIPTION	Mpa
R0	EXTREMELY WEAK ROCK	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	VERY WEAK ROCK	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	WEAK ROCK	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	MEDIUM STRONG ROCK	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	STRONG ROCK	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	VERY STRONG ROCK	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	EXTREMELY STRONG ROCK	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY

CODE	DESCRIPTION
0	NONE
1	MINOR
2	MODERATE
3	HEAVY

DROP TEST - CEMENTED JOINTS/DEFECTS

CODE	CATEGORY
0	STRONG (NEVER BREAKS)
1	MODERATE (SOMETIMES BREAKS)
3	WEAK (ALWAYS BREAKS)

JOINT CONDITION - SMALL SCALE

CODE	CATEGORY	SUBCATEGORY
1	STEPPED	ROUGH
2		SMOOTH
3		SLICKENSIDED
4	UNDULATING	ROUGH
5		SMOOTH
6		SLICKENSIDED
7	PLANAR	ROUGH
8		SMOOTH
9		SLICKENSIDED

JOINT FILLING

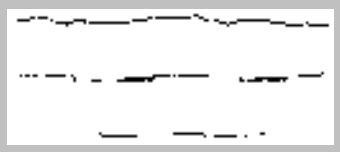
CODE	CATEGORY	SUBCATEGORY
1	NON	COARSE
2	SOFTENING	MEDIUM
3		FINE
4	SOFT	COARSE
5	SHEARED	MEDIUM
6		FINE
7	GOUGE THIKNESS < IRREGULARITIES	
8	GOUGE THIKNESS > IRREGULARITIES	
9	NO INFILL	

JOINT ALTERATION

CODE	DESCRIPTION
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

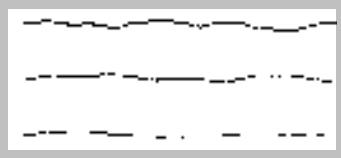
JOINT CONDITIONS - SMALL SCALE

	Laubscher	Jr	JRC
ROUGH	1	4	20
SMOOTH	2	3	14
SLICKEN-SIDED	3	2	11



STEPPED

ROUGH	4	3	14
SMOOTH	5	2	11
SLICKEN-SIDED	6	1.5	7



UNDULATING

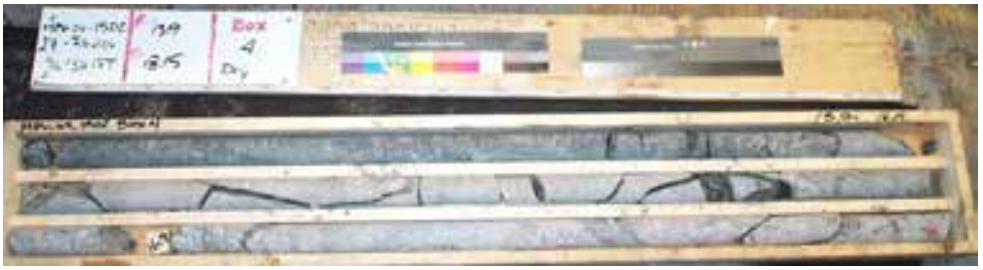
ROUGH	7	1.5	2.5
SMOOTH	8	2	1.5
SLICKEN-SIDED	9	0.5	0.5

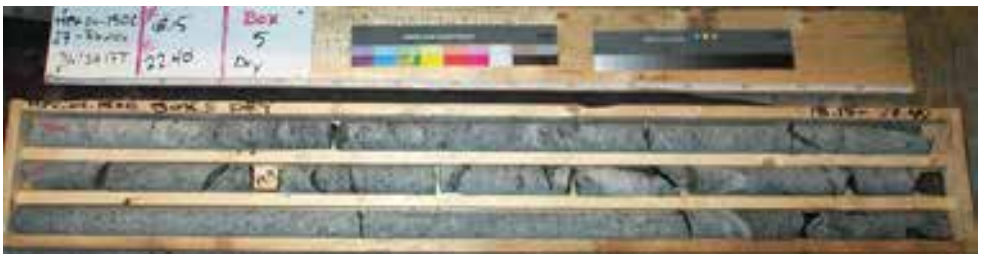
PLANAR

SRK STEFFEN, ROBERTSON AND KIRSTEN
Consulting Engineers

MPV_04_150C

MPV_04_150C





Diary

MPV-04-150c

NS26/02/2004

	move and set-up on hole MPV-04-150C
0130hrs	set-up finished, hoses burried (long sludge line)
0200hrs	start to put casing in
0630hrs	13.2m casing to 7.5m; more casing had to be added and length of casing rods changed, therefore the rods were pulled. When going back into this hole it might be possible that current hole will be intersected partially or that a new hole will be started as casing kicked off some boulders when it was set initially.

DS27/02/2004

0700 - 1030	Take out casing. Casing reinstalled (to 7.5 m). Bedrock at
1030hrs	6.9m depth.
1400hrs	Packer test at 12.4 to 16.9m
1550hrs	Packer test at 15.4 to 19.9m
1720hrs	Packer test at 18.4 to 22.9m
1840hrs	Finished drilling (25.9m). Set up packer test

NS27/02/2004

2045hrs	Packer test completed (21.4-25.9m) take reflex reading, cement hole, prepare for move

SRK Consulting
Engineers and Scientists

FIELD DRILL PERFORMANCE LOG

PROJECT	**Gahcho Kue Geotech**
PROJECT NO	**2CD002.11**
NORTHING	7035216
EASTING	588256
SURFACE ELEVATION	404
AZIMUTH	0
DIP	-90

HOLE NO:	**MPV-04-150c**
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	26-02-2004 19:00
FINISH DATE AND TIME	27-02-2004 21:00
HOLE DIAMETER	47.6 (NQ)
DRILLING METHOD	Diamond core

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
NS 1900-0700	B Rameseder	26/02/2004		12	7	13.2	move, set-up, casing/ drilling in sedimen	13.2	5	2.64	12	7	5	2.64
DS 0700-1900	M Story	27/02/2004		12	3.5	25.90	Reinstall casing; 3 packer tests	12.7	8.5	1.49	24	10.5	13.5	1.92
NS 1900-0700	B Rameseder	27/02/2004		3	3	25.90	1 packer test, reflex, cementing, move	0	0	0.00	27	13.5	13.5	1.92

OVERALL HOLE DRILL RATE (m/hr)	0.96
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	1.92

GENERAL GEOTECH LOG DRILLHOLE ID: **MPV-04-150c**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
4.50	10.78	6.28	Overburden							grey -brown, silty clay, saturated, loose, uniform grain size;quartz, biotite g
10.78	12.20	1.42	BGRN	1.40	98.6	1.35	95.1	1.09	76.8	BGRN: grey biotite granite; digested mafic xenolith at top 7cm
12.20	13.20	1.00	BGRN	0.95	95.0	0.95	95.0	0.95	95.0	
		0.00								
7.10	7.90	0.80	BGRN	0.80	100.0	0.80	100.0	0.80	100.0	Redrill hole one dia distance from first drill hole. Evidence of previous drilling on core.
7.90	10.90	3.00	BGRN	3.00	100.0	2.90	96.7	2.90	96.7	
10.90	13.90	3.00	BGRN	3.00	100.0	2.90	96.7	2.90	96.7	loss of return at 11.4 m.
13.90	16.90	3.00	AMP	3.00	100.0	3.00	100.0	3.00	100.0	Rock becoming darker with depth; amphibolte:AMP
16.90	19.90	3.00	AMP	3.00	100.0	3.00	100.0	3.00	100.0	
19.90	22.90	3.00	AMP	3.00	100.0	3.00	100.0	3.00	100.0	
22.90	25.90	3.00	AMP	2.95	98.3	2.90	96.7	2.82	94.0	
	EOH									

DETAILED GEOTECHNICAL LOG

DRILLHOLE ID: **MPV-04-150c**

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

FROM	TO	ROCK	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of			JOINT CONDITIONS				COMMENT
(m)	(m)	TYPE	STRONG R	WEAK R	% WEAK	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH	Sets	Type	Totals	ANGLE	ROUGH	ALT	FILL	
10.8	13.2	**BGRN**	R5		0	10	0	1	1	1			1	J1	1	75	5	1	9	
																				joint shows hematite stained alteration, up to 2mm from joint
7.1	7.9	**BGRN**	R5		0	8	0	0	0											
7.9	10.9	**BGRN**	R4		0	22	0	4	0		1	0	2	J1	1	30	9	0		
														J2	3	65	5			Thin coating on J1. J2 1 joint at 70 deg, 2 joints at 65 deg.
10.9	13.9	**BGRN**	R4		0	19	0	3	0		0		2	J1	1	30	4			
														J2	2	55	4			silt film at J1.
13.9	16.9	**AMP**	R5		0	19	0	6	0		1	0	3	J1	3	30	5			
														J2	2	45	4			
														J3	1	70	4			J2 one joint at 50 deg.
16.9	19.9	**AMP**	R3		0	10	0	2	0		0		1	J1	2	30	4	0	3	
																				J1 has calcite coating.
19.9	22.9	**AMP**	R4		0	15	0	4	0		2	0	2	J1	1	70	4	0	2	
														J2	3	40	1			
22.9	25.9	**AMP**	R5	R3	10	20	0	11	3	1	2	0		J1	2	70	2	0	3	
														J2	1	40	5	0	2	
														J3	4	45	8	1	2	Joint set 4: 4 joints at 80 angle, 4 rough, alt 0, fill 2; breaks at contacts

Photo Record

MPV-04-150c

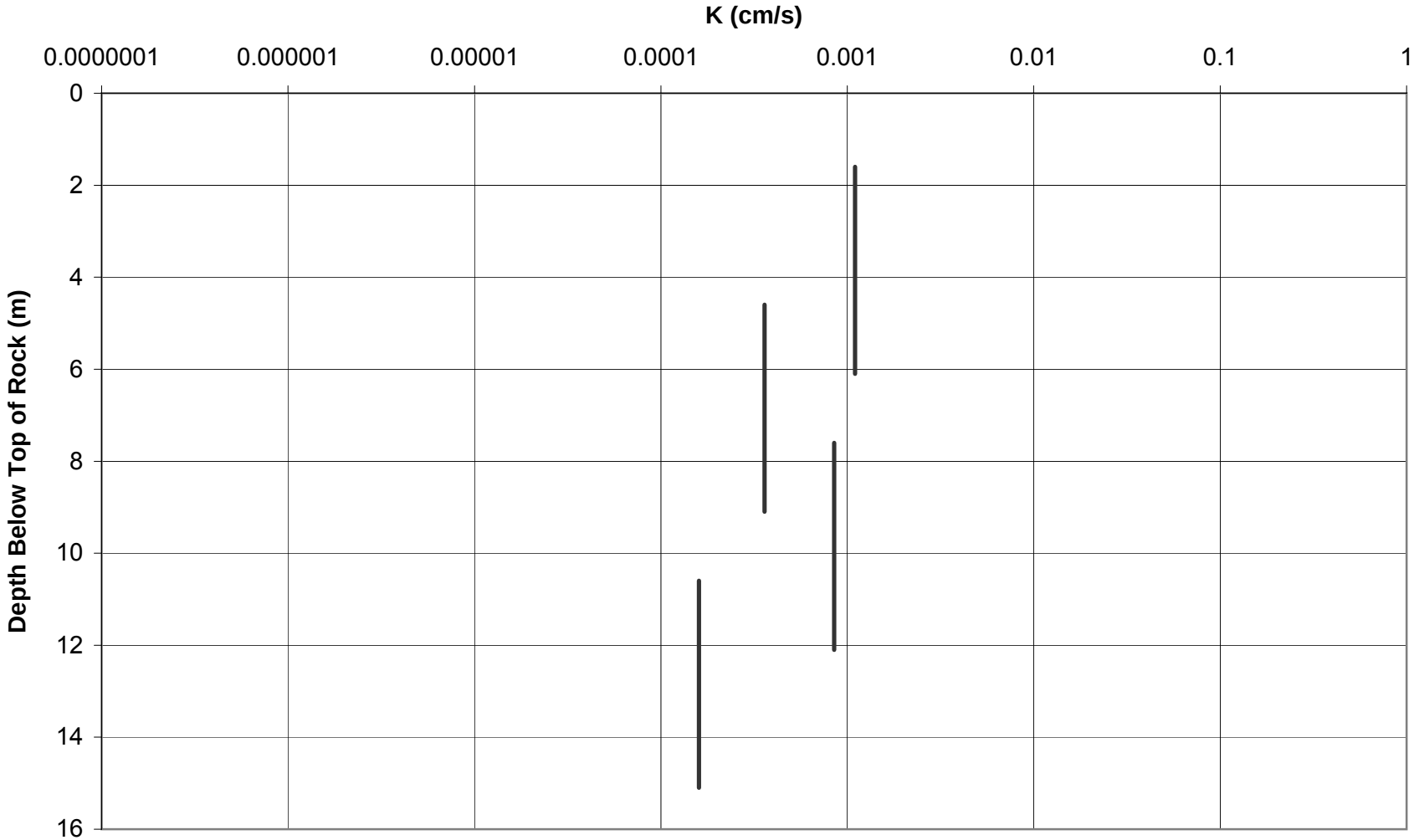
Date	Shift	Filename	Depth	Description
26-Feb-04	NS 1900-0700	MPV-04-150C_4.5_10.78m_box1	sediments	
26-Feb-04	NS 1900-0700	MPV-04-150C_4.5_10.78m_box1_2	sediments	
27-Feb-04	DS 0700-1900	MPV-04-150C_6.8m_box2	6.8 - 10.75	
27-Feb-04	DS 0700-1900	MPV-04-150C_10.75m_box3	10.75 - 13.9	
27-Feb-04	DS 0700-1900	MPV-04-150C_13.9m_box4	13.9 - 18.15	
27-Feb-04	DS 0700-1900	MPV-04-150C_18.15m_box5	18.15 - 22.40	
27-Feb-04	DS 0700-1900	MPV-04-150C_22.40m_box6	22.40-25.90	
			EOH	

Core Box Record

MPV-04-150c

Box	From	To	Comments
1	4.50		sediment sample at top of box
2	6.80	10.75	
3	10.75	13.90	
4	13.90	18.15	
5	18.15	22.40	
6	22.40	25.90	
7	EOH		
8			
9			
10			
11			
12			

Permeability vs Depth
MPV_04_150C



Packer Test Data

Date	27-Feb-04
Staff	M. Story, B. Rameseder
Init. WL:	0
Ref. Pt.	drill shack floor
Dip	90

MPV-04-150c

Test 1 12.4 16.9

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments
1	0	4028.80		3.7	**no leaks**
	1	4030.50	1.70		
	2	4031.50	1.00		
	3	4033.00	1.50		
	4	4034.80	1.80		
	5	4036.50	1.70		
	5	4038.20	1.70		
2	0	4042.50		7.5	**no leaks**
	1	4048.40	5.90		
	2	4054.40	6.00		
	3	4060.00	5.60		
	4	4066.20	6.20		
3	0	4073.00		11.0	**no leaks**
	1	4079.80	6.80		
	2	4086.80	7.00		
	3	4093.50	6.70		
	4	4100.40	6.90		
4	0	4105.30		7.5	**no leaks**
	1	4111.00	5.70		
	2	4117.00	6.00		
	3	4122.70	5.70		
	4	4128.50	5.80		
	5	4134.20	5.70		
5	0	4137.00		3.5	**no leaks**
	1	4138.80	1.80		
	2	4140.20	1.40		
	3	4142.10	1.90		
	4	4144.10	2.00		
	5	4146.00	1.90		

Summary

Flow rate (gpm)
1.70
5.80
6.90
5.80
1.90

Test 2 15.4 19.9

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments
1	0	4155.50		4.0	
	1	4156.10	0.60		
	2	4156.40	0.30		
	3	4156.70	0.30		
	4	4157.10	0.40		
	5	4157.40	0.30		

Summary

Flow rate (gpm)
0.3
3.5
0.4

2	0	4160.50		8.0	max pressure would have been 12 psi but was not properly set at drill
	1	4163.20	2.70		
	2	4166.80	3.60		
	3	4170.00	3.20		
	4	4173.60	3.60		
	5	4177.00	3.40		
3	0	4178.20		4.0	
	1	4179.60	1.40		
	2	4180.00	0.40		
	3	4180.40	0.40		
	4	4180.80	0.40		
	4	4181.20	0.40		
4	0				
	1		0.00		
	2		0.00		
	3		0.00		
	4		0.00		
5	0				
	1		0.00		
	2		0.00		
	3		0.00		
	4		0.00		
	5		0.00		
	6		0.00		
	7		0.00		

Test 3 **18.4** **22.9**

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments
1	0	4197.00		7.0	
	1	4200.00	3.00		

	2	4204.30	4.30			
	3	4208.30	4.00			**Summary**
	4	4212.20	3.90			Flow rate (gpm)
	5	4216.20	4.00			
2	0	4222.00		14.0		4.00
	1	4228.10	6.10			6.00
	2	4234.00	5.90			8.00
	3	4240.00	6.00			6.10
	3	4246.00	6.00			4.20
	4	4251.80	5.80			
3	0	4259.00		21.0		
	1	4267.10	8.10			
	2	4275.00	7.90			
	3	4283.00	8.00			
	4	4291.00	8.00			
	5	4299	8.00			
4	0	4305.10		14.0		
	1	4311.50	6.40			
	2	4317.60	6.10			
	3	4323.70	6.10			
	4	4329.90	6.20			
	5	4335.90	6.00			
5	0	4340.20		7.0		
	1	4344.80	4.60			
	2	4349.60	4.80			
	3	4353.60	4.00			
	4	4357.80	4.20			
	5	4362.00	4.20			

Test 4 **21.4** **25.9**

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pres (psi)	Comments	
1	0	4380.80		8.0	no leaks	
	1	4381.60	0.80			
	2	4382.70	1.10			**Summary**
	3	4383.60	0.90			Flow rate (gpm)
	4	4384.40	0.80			
	5	4385.20	0.80			0.80
	6	4386.00	0.80			1.50
2	0	4389.80		16.0	no leaks	2.10
	1	4391.30	1.50			1.40
	2	4393.00	1.70			0.80
	3	4394.50	1.50			
	4	4396.00	1.50			
	5	4397.50	1.50			
3	0	4404.30		25.5	no leaks	
	1	4406.70	2.40			
	2	4409.00	2.30			
	3	4411.10	2.10			
	4	4413.40	2.30			

	5	4415.50	2.10		
	6	4417.50	2.00		
	7	4419.6	2.10		
4	0	4420.80		16.0	no leaks
	1	4422.30	1.50		
	2	4423.80	1.50		
	3	4425.20	1.40		
	4	4426.60	1.40		
5	0	4427.00		8.0	no leaks
	1	4427.80	0.80		
	2	4428.70	0.90		
	3	4429.40	0.70		
	4	4430.20	0.80		
	5	4431.00	0.80		
	6	4431.80	0.80		

12.4	16.9

Pressure

(psi)

3.7
7.5
11.0
7.5
3.5

15.4	**19.9**

Pressure

(psi)

4.0
8.0
4.0

18.4	22.9

Pressure (psi)
7.0
14.0
21.0
14.0
7.0

21.4	25.9

Pressure (psi)
8.0
16.0
25.5
16.0
8.0

Packer Injection Test

input fields toned green

Drillhole No	**MPV-04-150c**			
Test interval	**From**	21.4	**To**	25.9
Date	27/02/2004			
Start time				
Finish time				

Dw	Measured depth of static water [1])	0	m
Dp	Measured depth to packer	21.4	m
Dr	Measured depth to top of rock	6.90	m
Dt	Depth to midpoint of test	23.65	m
Inc	Inclination from horizontal	90	°
Dw'	Vertical depth to static water level	0	m
Dp'	Vertical depth to packer	21.40	m
Dt'	Vertical depth to midpoint of test	23.65	m
Ps	Packer stretch pressure [2])	*60*	psi
Pwmax	Max packer working pressure [2])	*400*	psi
Pgmax	Max injection gauge pressure [3])	**25**	psi
Pinfmin	**Min packer inflation pressure**	**127**	**psi**
Pinfmax	**Max packer inflation pressure**	**430**	**psi**
Hg	Gauge height	0	m
Lp	Length of discharge pipe		m
rp	Radius of discharge pipe (1" = 0.0127m)		m
R	Radius of influence (10m is standard)		m
rb	Drillhole radius (HQ=0.048m, NQ=0.038m)	0.038	m
L	Length of test section	4.5	m
Hf	Friction loss	?	m
Hnit	Net injection at midpoint of test	?	m
K	Hydraulic conductivity	?	m

Measurement	**Q (gpm)**				
	Pg (psi) Step 1	**Pg (psi) Step 2**	**Pg (psi) Step 3**	**Pg (psi) Step 4**	**Pg (psi) Step 5**
1	3.7	7.5	11	7.5	3.5
2	4	8	4		
3	7	14	21	14	7
4	8	16	24	16	8
5					
6					
Qavg (gpm)					
G_{avg} (m^3/day)					
Hf (m)					
Hnit (m)					
K (m/day)					
K (cm/sec)					
Lugeons					

Notes:

1: If hole is dry enter Dw=drilling depth
2: Enter values from packer manufacturer
3: Pgmax (psi) = 1.5 x vertical depth (m) in rock to top of test section

Equations:

$Pinf_{min} = (1.42*Dp'+Ps+Pgmax)*1.1$

$Pinf_{max} = P_{wmax}+1.42*(Dp'-Dw')$

$Hf = 8.65x10^{-15} (Q^2*Lp/rp^5)$

$H_{nit} = (Dw'+Hg-Hf)+Pg/1.42$

$K = (Q*Ln(R/r_b))/2*\pi*H_{nit}*L)$

Conversion factors:

10m of water = 0.9807 bar = 1kg/cm^2 = 14.2 psi
1cm/sec = 864m/day
1 Lugeon = 1ltr/mi per metre at 10 bars
which is approximately 1.4 x 10^{-5} cm/sec
1 US gpm = 3.785 ltr/min = 5.45m^3/day

Permeability Summary

MPV-04-150c

from	to		Step 1	Step 2	Step 3	Step 4	Step 5	Avg K
12.4	16.9	gauge (psi)	3.7	7.5	11	7.5	3.5	
		Qavg (igpm)	1.73	6	6.9	5.75	1.95	
		K cm/sec	**8.3E-04**	**1.4E-03**	**1.1E-03**	**1.4E-03**	**9.8E-04**	1.1E-03
15.4	19.9	gauge (psi)	4	8	4			
		Qavg (igpm)	0.33	3.4	0.4			
		K cm/sec	**1.5E-04**	**7.5E-04**	**1.8E-04**			3.6E-04
18.4	22.9	gauge (psi)	7	14	21	14	7	
		Qavg (igpm)	3.97	5.93	8	6.1	4.13	
		K cm/sec	**1.0E-03**	**7.5E-04**	**6.7E-04**	**7.7E-04**	**1.0E-03**	8.5E-04
21.4	25.9	gauge (psi)	8	16	25.5	16	8	
		Qavg (igpm)	0.8	1.5	2.1	1.4	0.8	
		K cm/sec	**1.8E-04**	**1.7E-04**	**1.5E-04**	**1.5E-04**	**1.8E-04**	1.6E-04
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	#DIV/0!
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	#DIV/0!

Dw	Measured depth of static water (1)	*0*	m
Dp	Measured depth to packer		m
Dt	Depth to midpoint of test		m
Inc	Inclination from horizontal		m
Dw'	Vertical depth to static water level		°
Dp'	Vertical depth to packer		m
Dt'	Vertical depth to midpoint of test		m
Hg	Gauge height	*0*	m
Lp	Length of discharge pipe		m
rp	Radius of discharge pipe (1" = 0.0127m)		m
R	Radius of influence (10m is standard)	10	m
rb	Drillhole radius (HQ=0.048m, NQ=0.038m)	0.038	m
L	Length of test section		m
Hf		0	m

Equations:

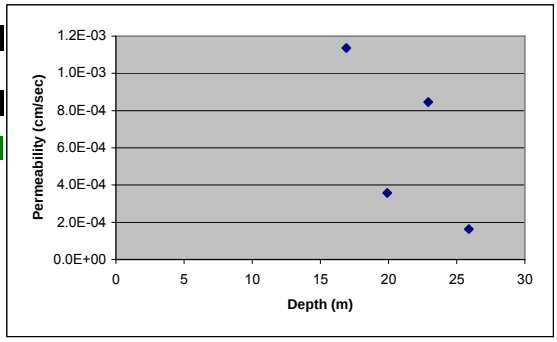
$Hf = 8.65x10^{-15} (Q^2 * Lp / rp^5)$

$H_{nit} = (Dw' + Hg - Hf) + Pg/1.42$

$K = (Q * Ln(R/r_b))/2 * \pi * H_{nit} * L)$

Overall 6.3E-04

assume
- vertical drillhole
- water at ground surface
- height of gauge is at rig flr
- negligible friction losses



Reflex Readings **MPV-04-150C**

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Field	Temp ©
27-Feb-04	25.9	193.7	88	181.2	5934	10.3

FIELD GEOLOGICAL LOG

HOLE ID **MPV-04-150c**

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	4.50	Ice/water		1.5m ice; to 4.5m water	BR
4.5	10.78	Overburden		silty clay	BR
10.78		BGRN		grey biotite granite; digested mafic xenolith at top 7cm	BR

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	4.50	Ice/water		1.5m ice; to 4.5m water	BR
4.5	7.1	Overburden		silty clay	BR
7.10	13.90	BGRN		grey biotite granite	BR
13.90	25.90	AMP		Amphibolite (hb) with digested granite xenoliths and granitic dyklets and irregular granitic stringers; amphibolite : dark green, coarse to medium grained; local biotite rich zones associate with granitic xenoliths	BR/Clee
EOH					

POINT LOAD TEST - INPUT

DRILL HOLE ID: MPV-04-150C

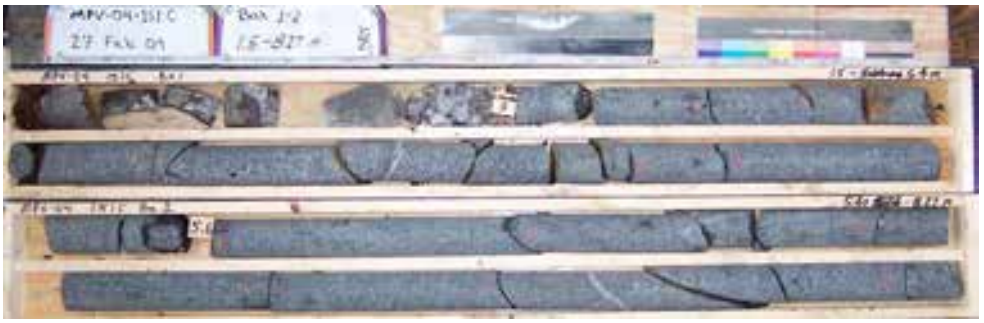
No. #	TESTED BY	DATE	HOLE/ FACE ID	DIST. (m)	ROCK TYPE	TEST TYPE	ORINT	DAYS	W (mm)	D (mm)	P (kN)	COMMENT
1	John Delgaty	##########	MPV-04-150C	12.70	Granite	1				47.30	18.01	Pink/grey/black/white granite - a good clean break
2	John Delgaty	##########	MPV-04-150C	to	Granite	1				47.30	20.22	Pink/grey/black/white granite - a good clean break
3	John Delgaty	##########	MPV-04-150C	12.84	Granite	1				47.30	28.01	Pink/grey/black/white granite - a good clean break
1	John Delgaty	##########	MPV-04-150C	13.11	Granite	1				47.30	16.08	Pink/grey/black/white granite - a good clean break
2	John Delgaty	##########	MPV-04-150C	to	Granite	1				47.30	14.57	Pink/grey/black/white granite - a good clean break
3	John Delgaty	##########	MPV-04-150C	13.32	Granite	1				47.30	16.68	Pink/grey/black/white granite - a good clean break
1	John Delgaty	##########	MPV-04-150C	25.73	Granite	1				47.60	17.15	Black/medium grained biotite rich granite - a good clean break
2	John Delgaty	##########	MPV-04-150C	to	Granite	1				47.60	20.99	Black/medium grained biotite rich granite - a good clean break
3	John Delgaty	##########	MPV-04-150C	25.55	Granite	1				47.60	21.81	Black/medium grained biotite rich granite - a good clean break
1	John Delgaty	##########	MPV-04-150C	25.25	Granite	1				47.60	8.00	Black/medium grained biotite rich granite - a good clean break
2	John Delgaty	##########	MPV-04-150C	to	Granite	1				47.60	6.83	Black/medium grained biotite rich granite - a good clean break
3	John Delgaty	##########	MPV-04-150C	24.75	Granite	1				47.60	11.66	Black/medium grained biotite rich granite - a good clean break

UCS SAMPLES

HOLE ID: MPV-04-150C

HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-150C	3	12.84-13.11	Granite	04-UCS-150-001
MPV-04-150C	6	25.25-25.55	Granite/Diorite	04-UCS-150-002

MPV_04_151C



MPV_04_151C

SRK Consulting
Engineers and Scientists

FIELD DRILL PERFORMANCE LOG

PROJECT:	Gahcho Kue Dike Hydrology
PROJECT NO:	HCI-1759 Hole MPV_04_151C
NORTHING:	7,035,208
EASTING:	588,182
SURFACE ELEVATION:	407
AZIMUTH:	87
DIP:	70

HOLE NO:	**MPV-04-151C**
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	02/26/2004 8:00
DATE AND TIME FINISHED:	02/26/2004 17:20
HOLE DIAMETER:	75.7 mm
DRILLING METHOD:	NQ Diamond core
DIKE	1

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
NS 1900-0700	K. Bass	02/26/2004	12:00 AM	12	0	0	moving rig							
DS 0700-1900	S. Axen	02/27/2004	12:00 AM	12		31.6	install & test thermistor. Start moving	31.6	12		#####	#####	#VALUE!	#VALUE!

OVERALL HOLE DRILL RATE (m/hr)	1.32
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	2.63

GEOTECH LOGGING 1 - INPUT (GENERAL GEOTECH LOG)

DRILLHOLE ID: **MPV-04-144C**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
1.50	3.00	1.50	till	0.80	53.3	0.27	18.0	0.20	13.3	broken quartz & diorite
3.00	5.60	2.60	diorite	2.34	90.0	0.77	29.6	1.60	61.5	
5.60	8.60	3.00	diorite	3.00	100.0	2.67	89.0	2.40	80.0	
8.60	11.60	3.00	diorite	3.00	100.0	2.81	93.7	2.81	93.7	
11.60	14.60	3.00	diorite	2.86	95.3	2.53	84.3	2.53	84.3	
14.60	17.60	3.00	diorite	3.00	100.0	2.38	79.3	2.92	97.3	
17.60	20.60	3.00	diorite	2.99	99.7	2.84	94.7	2.84	94.7	
20.60	23.60	3.00	diorite	3.00	100.0	3.00	100.0	3.00	100.0	
23.60	26.60	3.00	diorite	3.00	100.0	2.80	93.3	2.80	93.3	Pyrite noted at 26.5 m
26.60	29.60	3.00	diorite	2.96	98.7	2.96	98.7	2.96	98.7	
29.60	31.60	2.00	diorite	1.97	98.5	2.83	141.5	1.81	90.5	

GEOTECHNICAL LOGGING 2 - INPUT (DETAILED LOG)

DRILLHOLE ID: **MPV-04-144C**

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

FROM	TO	ROCK	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of			JOINT CONDITIONS				COMMENT
(m)	(m)	TYPE	% STRONG	% WEAK	OVERALL	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH	Sets	Type	Totals	ANGLE	ROUGH	ALT	FILL	
1.5	3.0	**Till**	100	80		0	0	0	0	0	0	0	0							Glacial till
			R5																	
3.0	5.6	**diorite**	100			6	0	1	1	1	0	0								
			R4																	
5.6	8.6	**diorite**	100			4	0	3	0	0	0	0	3	J1	1	78	4	0	9	
			R4											J2	1	37	4	0	9	
														J3	1	20	8	1	8	
8.6	11.6	**diorite**	100			2	0	1	0	0	0	0	1	J1	1	65	4	0	6	
			R4																	
11.6	14.6	**diorite**	100			8	0	8	0	0	0	0	3	J1	4	60	4	1	3	J1 mild chloritization, J2 has black clay/gouge fill
			R4											J2	3	45	7	0	3	
														J3	1	30	4	0	9	
14.6	17.6	**diorite**	100			7	0	4	1	1	0	0	3	J1	2	18	4	1	8	J1 gouge at 15.44 m
			R4											J2	1	48	4	0	9	
														J3	1	38	1	0	9	
17.6	20.6	**diorite**	100			2	0	3	0	0	0	0	3	J1	1	46	4	0	9	
			R4											J2	1	68	7	0	9	
														J3	1	57	4	1	9	
20.6	23.6	**diorite**	95	5	100	3	0	2	0	0	0	0	1	J1	2	16	4	0	9	
			R4	R3	R4															
23.6	26.6	**diorite**	95	5	100	2	0	2	0	0	0	0	1	J1	2	16	4	0	9	
			R4	R3	R4															
26.6	29.6	**diorite**	100			1	0	1	0	0	0	0	1	J1	1	76	4	0	9	
			R4																	
29.6	31.6	**diorite**	100			1	4	3	0	0	0	0	2	J1	2	53	4	0	9	
			R4											J2	1	85	7	0	9	
EOH																				
				50																
				R2																
				50																
				R3																
														J1						
														J2						

															J1 J2							
															J1 J2							
															J1 J2 J3							
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						100																
						100																

Validation data: (Do not alter)

IRS:	IRS:	Joint amounts:	Joint Fill Strength:	Microdefect Intensity:	Microdefect strength:	No of joint sets:	Joint type:	Joint Roughness:	Joint Wall Alteration:	Joint Infill:
%:	Categories:	0	0	0	0	1	J1	1	0	1
0	R0	1	1	1	1	1+1	J2	2	1	2
5	R1	2	2	2	2	2	J3	3	2	3
10	R2	3		3		2+1		4		4
15	R3	4				3		5		5
20	R4	5				3+1		6		6
25	R5	6						7		7
30	R6	7						8		8
35		8						9		9
40		9								
45		10								
50		11								
55		12								
60		13								
65		14								
70		15								
75		16								
80		17								
85		18								
90		19								
95		20								
100		21								
		22								
		23								
		24								
		25								
		26								
		27								
		28								
		29								
		30								

SRK Photo Log Sheet

Drillhole ID: **MPV-04-151C**

Shift	Camera Photo Number	Filename	Depth	Description
	1	MPV_04_151C_01.5-08.27m_dry_box01-02.jpg	01.5-08.27	
	2	MPV_04_151C_08.27-14.2m_dry_box03-04.jpg	08.27-14.2	
	3	MPV_04_151C_14.2-19.9M_dry_box01-02.jpg	14.2-19.9	
	4	MPV_04_151C_19.9-25.6m_dry_box03-04.jpg	19.9-25.6	
	5	MPV_04_151C_25.6-31.5m_dry_box05-06.jpg	25.6-31.5	
	6	MPV_04_151C_31.5-31.6_dry_box11.jpg	31.5-31.6	

Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-151C	1	1.50	8.27
MPV-04-151C	2	8.27	14.20
MPV-04-151C	3	14.20	19.90
MPV-04-151C	4	19.90	25.60
MPV-04-151C	5	25.60	31.50
MPV-04-151C	6	31.50	31.60

ORIENTATION INPUT SHEET

Drill hole Information

ID:	**MPV-04-151C**
Dip:	**70**
Azimuth:	**87**

Drilling Contractor:	Boart Longyear
Orientation Method Used:	Easy Mark

GENERAL			**ORIENTATION**			**DISCONTINUITIES**							**COMMENTS**
No	Logged by	DEPTH (m)	ROCK TYPE	TOP/ BOTT.	AXIS A-angle	CIRC B-angle	DISCONT TYPE	CLOSE/ OPEN	FILL TYPE	FILL THICK	FILL HARD	JC *) SMALL	

Validation Data (Do Not Alter)

Orientation:	Discontinui	C/O:	JC
Top	Joint	Close	
Bottom	Open Bed	Open	

Reflex Readings **MPV-04-151C**

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Field	Temp ©
27-Feb-04	31.6	65.5	70	292.3	5854	14.4

FIELD GEOLOGICAL LOG
HOLE I.D.: MPV-04-151C

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	1.50	Ice/Water	0		KB/SA
1.50	3.00	Overburden	0	Glacial till and broken quartz and diorite.	KB/SA
3.00	31.60	Diorite	0	Mild chlorinization noted. Black clay gouge also noted. Pyrite at 26.50m	KB/SA

POINT LOAD TEST - INPUT

DRILL HOLE ID: MPV-04-151C

No. #	Tested by	DATE	HOLE/ FACE ID	DIST. (m)	ROCK TYPE	TEST TYPE	ORINT	DAYS	W (mm)	D (mm)	P (kN)	COMMENT

GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH

	CATEGORY	DESCRIPTION	Mpa
R0	EXTREMELY WEAK ROCK	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	VERY WEAK ROCK	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	WEAK ROCK	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	MEDIUM STRONG ROCK	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	STRONG ROCK	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	VERY STRONG ROCK	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	EXTREMELY STRONG ROCK	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY

CODE	DESCRIPTION
0	NONE
1	MINOR
2	MODERATE
3	HEAVY

DROP TEST - CEMENTED JOINTS/DEFECTS

CODE	CATEGORY
0	STRONG (NEVER BREAKS)
1	MODERATE (SOMETIMES BREAKS)
3	WEAK (ALWAYS BREAKS)

JOINT CONDITION - SMALL SCALE

CODE	CATEGORY	SUBCATEGORY
1	STEPPED	ROUGH
2		SMOOTH
3		SLICKENSIDED
4	UNDULATING	ROUGH
5		SMOOTH
6		SLICKENSIDED
7	PLANAR	ROUGH
8		SMOOTH
9		SLICKENSIDED

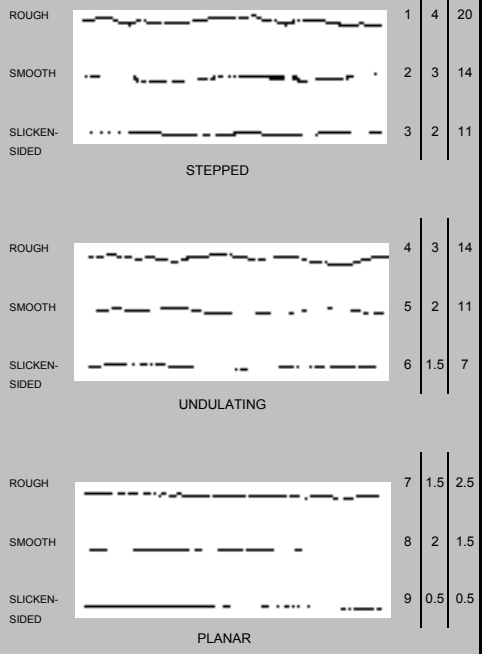
JOINT FILLING

CODE	CATEGORY	SUBCATEGORY
1	NON	COARSE
2	SOFTENING	MEDIUM
3		FINE
4	SOFT	COARSE
5	SHEARED	MEDIUM
6		FINE
7	GOUGE THIKNESS < IRREGULARITIES	
8	GOUGE THIKNESS > IRREGULARITIES	
9	NO INFILL	

JOINT ALTERATION

CODE	DESCRIPTION
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE



	Laubscher	Jr	JRC
ROUGH	1	4	20
SMOOTH	2	3	14
SLICKEN-SIDED	3	2	11
ROUGH	4	3	14
SMOOTH	5	2	11
SLICKEN-SIDED	6	1.5	7
ROUGH	7	1.5	2.5
SMOOTH	8	2	1.5
SLICKEN-SIDED	9	0.5	0.5

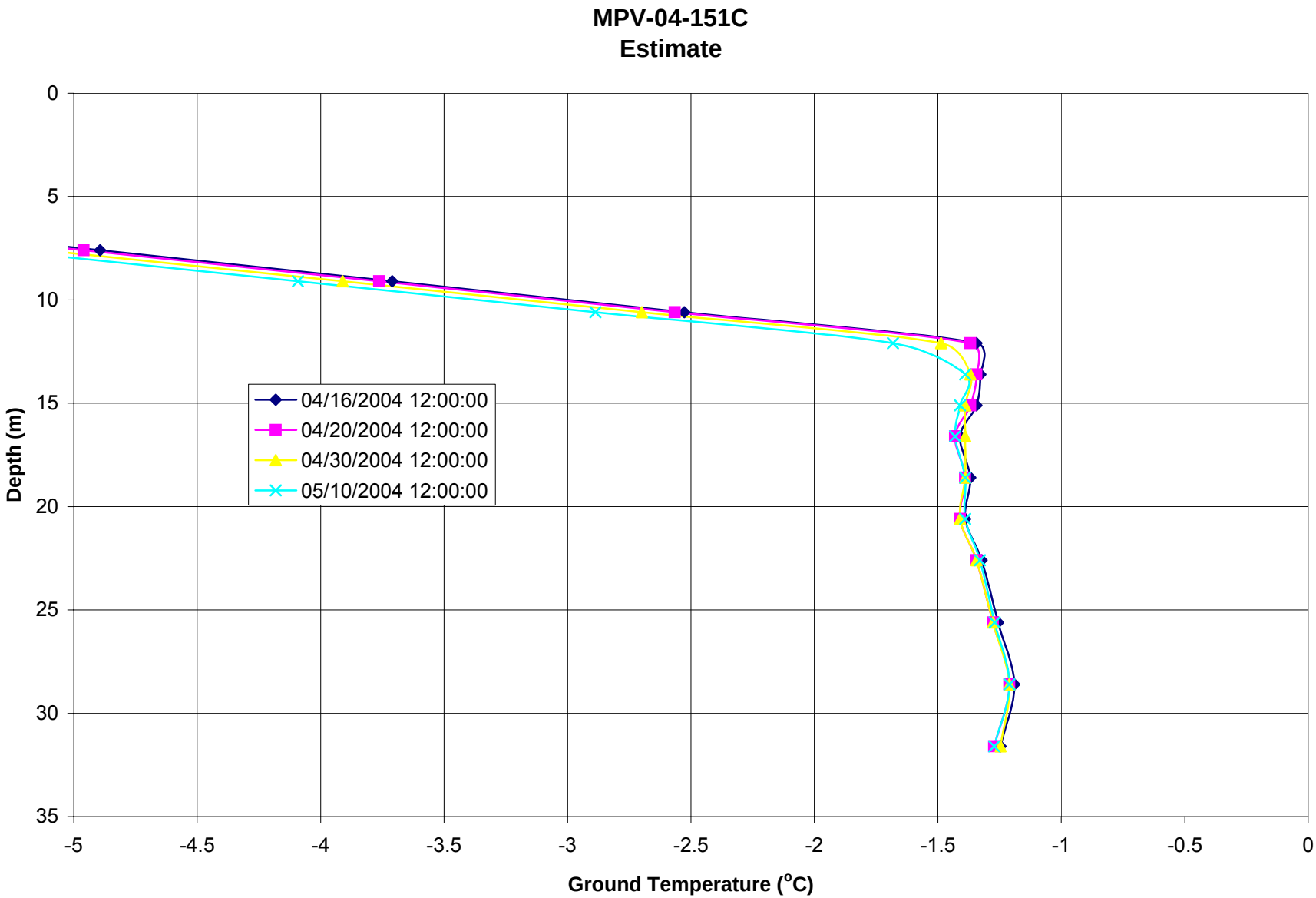
STEFFEN, ROBERTSON AND KIRSTEN
Consulting Engineers

Thermistor Readings

MPV-04-188c

Thermistor String ID: **32/16 -12**

Thermis Node	Reading (kOhms)	Comments
1	14.30	
2	14.01	
3	13.75	
4	12.77	
5	12.82	
6	12.99	
7	12.61	
8	12.58	
9	12.85	
10	12.82	
11	12.42	
12	13.61	
13	12.85	
14	12.96	
15	12.96	
16	14.72	


MPV-04-151C
Estimate
Depth (m)
0
5
10
15
20
25
30
35
-5
-4.5
-4
-3.5
-3
-2.5
-2
-1.5
-1
-0.5
0
Ground Temperature (°C)
04/16/2004 12:00:00
04/20/2004 12:00:00
04/30/2004 12:00:00
05/10/2004 12:00:00

Diary

MPV-04-154c

NS 27/02/2004

	moved from MPV-04-150C
	move and set-up took till end of shift; water line was frozen into ice;casing set to 3.3m (at bottom of lake not in rock yet)
	2.6m ice/water

DS 28/02/2004

0730hrs	Driller attempting to retreive sediment overburden.
0800hrs	At 7.0 m very little recovery of overburden. (Small cobbles, less than 1% recovery see picture (MPV-04-154C_poor recovery of sediments)). Overburden washed away.
0930hrs	Casing taken out of hole. Drill bit destroyed. Driller went back to camp for parts.
1145hrs	Casing installation completed. Bottom of casing at 9.1 m below floor. Casing advanced .3 m into bedrock. Bedrock at 8.8m. Overburden at 3.3m below floor level. Ice at 0.7m below floor level. Drilling into bedrock.
1500hrs	at 20.8m. Set up for Packer test.
1545hr	Packer test completed.
1700hr	at 23.8m. Set up for packer test.
1745hr	Packer test completed.

NS 28/02/2004

1945hrs	set for packer test
2030hrs	packer test 3 completed (22.3-26.8m)
2130hrs	drilled to 29.8m
2240hrs	packer test 4 completed (25.3-29.8m)
2400hrs	reflex completed
	pull casing, move

SRK Consulting
Engineers and Scientists

FIELD DRILL PERFORMANCE LOG

PROJECT	**Gahcho Kue Geotech**
PROJECT NO	**2CD002.11**
NORTHING	7035225
EASTING	588319
SURFACE ELEVATION	404.4
AZIMUTH	0
DIP	-90

HOLE NO:	**MPV-04-154c**
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	27/02/2004 22:00
FINISH DATE AND TIME	01/29/2004 0:00
HOLE DIAMETER	47.6 (NQ)
DRILLING METHOD	Diamond core

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
NS 1900-0700	B Rameseder	27/02/2004		9	8.5	3.3	move and set-up; water line frozen into ice; 3.3m casing	3.3	0.5	6.60	9	8.5	0.5	6.60
DS 0700-1900	M Story	28/02/2004		12	4	26.80	Problems installing casing. 2 packer tests completed	23.5	8	2.94	21	12.5	8.5	3.15
NS 1900-0700	B Rameseder	28/02/2004		5	4	29.80	2 pcker tests, reflex, cement hole, move to next hole	3	1	3.00	26	16.5	9.5	3.14

OVERALL HOLE DRILL RATE (m/hr)	1.15
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	3.14

GENERAL GEOTECH LOG DRILLHOLE ID: **MPV-04-154c**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
8.80	11.80	3.00	GRN	2.98	99.3	2.98	99.3	2.98	99.3	GRN: granite
11.80	14.80	3.00	GRN	3.00	100.0	3.00	100.0	2.91	97.0	GRN, lost water return at 13m.
14.80	17.80	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
17.80	20.80	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
20.80	23.80	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
23.80	26.80	3.00	GRN	2.90	96.7	2.90	96.7	2.90	96.7	
26.80	29.80	3.00	GRN	3.03	101.0	3.03	101.0	3.03	101.0	
	EOH									

DETAILED GEOTECHNICAL LOG DRILLHOLE ID: **MPV-04-154c**

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

FROM (m)	TO (m)	ROCK TYPE	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of Sets	Type	Totals	JOINT CONDITIONS				COMMENT
			STRONG R	WEAK R	% WEAK	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH				ANGLE	ROUGH	ALT	FILL	
8.8	11.8	**GRN**	R3			18	0	3	0		1	0	2	J1	2	70	5	0	9	
														J2	1	60	5	0	1	J1 - thin calcite coating.
11.8	14.8	**GRN**	R5			14	0	3	0		0		2	J1	2	70	5	0	1	
														J2	1	55	5	0	9	J1 - thin calcite coating.
14.8	17.8	**GRN**	R6			11	0	2	0		1	0	2	J1	1	65	4	0	2	
														J2	1	70	6	0	2	J1 and J2 have calcite coating.
17.8	20.8	**GRN**	R6			7	0	2	0		0		2	J1	1	25	9	0	1	
														J2	1	70	4	0	1	J1 and J2 have calcite coating.
20.8	23.8	**GRN**	R6			7	0	0	0		0									Mechanical breaks only.
23.8	26.8	**GRN**	R5			13	0	7	0		1	1	3	J1	4	65	2	0	9	
														J2	1	40	4	0	3	
														J3	2	70	2	0	2	dark coating on joint set 3
26.8	29.8	**GRN**	R5			9	0	4	0		2	1	3	J1	1	65	5	0	3	
														J2	1	40	4	0	9	
														J3	2	75	5	0	3	dark coating (dark green) on joint sets 1 and 3
EOH																				

FIELD GEOLOGICAL LOG

HOLE ID MPV-04-154c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	2.60	Ice/water		Ice/water	BR
2.6	8.1	Overburden		Unable to collect representative sample.	MS
8.10	29.80	GRN		Granite: pink compact granite with hematite stains; medium-coarse grained	MS
EOH					

Photo Record

MPV-04-154c

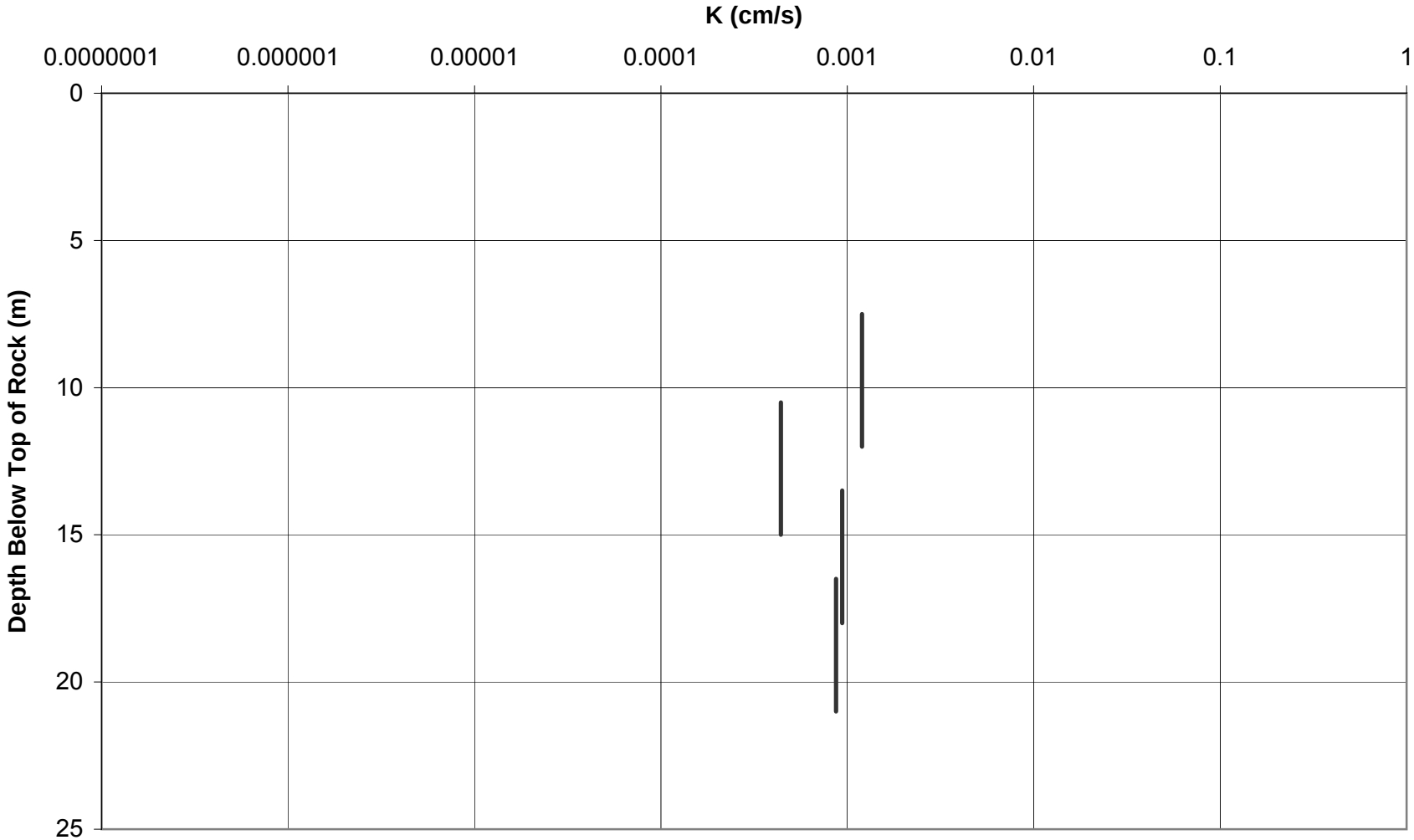
Date	Shift	Filename	Depth	Description
28-Feb-04	DS 0700-1900	MPV-04-154C_8.7m_box1	8.7m - 13m	Granite
28-Feb-04	DS 0700-1900	MPV-04-154C_13m_box2	13m - 17.2m	Granite
28-Feb-04	DS 0700-1900	MPV-04-154C_17.2m_box3	17.2m-21.5m	Granite
28-Feb-04	NS 1900-0700	MPV-04-154C_21.5m_box4	21.5m-25.8m	Granite
28-Feb-04	NS 1900-0700	MPV-04-154C_25.8m_box5	25.8m-29.8m	Granite

Core Box Record

MPV-04-154c

Box	From	To	Comments
1	8.70	13.00	
2	13.00	17.20	
3	17.20	21.50	
4	21.50	25.80	
5	25.80	29.80	
6	EOH		
7			
8			
9			
10			
11			
12			

Permeability vs Depth
MPV_04_154C



Packer Test Data

Date	28-Feb-04
Staff	M. Story, B. Rameseder
Init. WL:	0
Ref. Pt.	drill shack floor
Dip	90

MPV-04-154c

Test 1 16.3 20.8

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pres (psi)	Comments
1	0	4442.00			no leaks
	1	4443.90	1.90	5.0	
	2	4445.80	1.90	5.0	
	3	4447.60	1.80	5.0	
	4	4449.60	2.00	5.0	
	5	4451.60	2.00	5.0	
	6	4453.80	2.20	5.0	
	7	4455.70	1.90	5.0	
	8	4457.60	1.90	5.0	
	9	4459.50	1.90	5.0	
2	0	4468.00		10.0	no leaks
	1	4474.80	6.80	10.0	
	2	4481.20	6.40	10.0	
	3	4487.80	6.60	10.0	
	4	4494.60	6.80	10.0	
	5	4501.20	6.60	10.0	
	6	4507.80	6.60	10.0	
3	0	4514.00		15.0	no leaks
	1	4522.40	8.40	15.0	
	2	4530.60	8.20	15.0	
	3	4539.00	8.40	15.0	
	4	4547.40	8.40	15.0	
	5	4555.7	8.30	15.0	
4	0	4562.00		10.0	no leaks
	1	4569.40	7.40	10.0	
	2	4576.60	7.20	10.0	
	3	4584.00	7.40	10.0	
	4	4591.30	7.30	10.0	
	5	4598.50	7.20	10.0	
5	0	4606.00			no leaks
	1	4610.90	4.90		
	2	4615.80	4.90		
	3	4620.80	5.00		
	4	4625.80	5.00		

Summary 16.3 20.8

(gpm)	(psi)
1.90	5.0
6.67	10.0
8.36	15.0
7.30	10.0
4.97	5.0

Test 2 19.3 23.8

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pres (psi)	Comments
1	0	4638.50		6.0	
	1	4639.60	1.10	6.0	
	2	4641.10	1.50	6.0	
	3	4642.40	1.30	6.0	
	4	4643.90	1.50	6.0	
	5	4645.30	1.40	6.0	
	6	4646.70	1.40	6.0	
2	0	4649.50		12.0	
	1	4652.50	3.00	12.0	
	2	4655.50	3.00	12.0	
	3	4658.50	3.00	12.0	
	4	4661.40	2.90	12.0	
	5	4664.40	3.00	12.0	
3	0	4668.00		19.0	
	1	4672.20	4.20	19.0	
	2	4676.40	4.20	19.0	
	3	4680.50	4.10	19.0	
	4	4684.40	3.90	19.0	
	5	4689.00	4.60	19.0	
	6	4693.10	4.10	19.0	
	7	4697.20	4.10	19.0	
	8	4701.40	4.20	19.0	
4	0	4705.10		12.0	
	1	4708.20	3.10	12.0	
	2	4711.30	3.10	12.0	
	3	4714.60	3.30	12.0	
	4	4717.70	3.10	12.0	
	5	4720.90	3.20	12.0	
5	0	4724.00			
	1	4725.80	1.80	6.0	
	2	4727.50	1.70	6.0	
	3	4729.30	1.80	6.0	

Summary 19.3 23.8

Flow rate (gpm)	Pressure (psi)
1.4	6.0
3.0	12.0
4.1	19.0
3.1	12.0
1.8	6.0

	4	4731.10	1.80	6.0	
	5	4732.90	1.80	6.0	

Test 3 22.3 26.8

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pres (psi)	Comments
1	0	4749.90		8.0	no leaks
	1	4754.50	4.60		
	2	4759.00	4.50		
	3	4763.60	4.60		
	4	4768.10	4.50		
	5	4772.70	4.60		
	6	4777.20	4.50		
2	0	4784.40		16.0	no leaks
	1	4792.00	7.20		
	2	4799.70	7.60		
	3	4807.40	7.70		
	4	4815.10	7.70		
	5	4822.80	7.70		
3	0	4831.80		24.5	no leaks
	1	4841.80	10.00		
	2	4851.80	10.00		
	3	4861.80	10.00		
	4	4871.90	10.10		
4	0	4880.20		16.0	no leaks
	1	4888.50	8.30		
	2	4896.70	8.20		
	3	4905.00	8.30		
	4	4913.10	8.10		
	5	4921.10	8.00		
	6	4929.40	8.30		
	7	4937.50	8.10		
	8	4945.60	8.10		
	9	4954.00	8.40		
	10	4962.10	8.10		
	11	4970.30	8.20		
5	0	4976.70		8.0	no leaks
	1	4982.30	5.60		
	2	4988.00	5.70		
	3	4993.60	5.60		
	4	4999.20	5.60		
	5	5004.80	5.60		

Summary 22.3 26.8

Flow rate (gpm)	Pressure (psi)
4.55	8.0
7.70	16.0
10.00	24.5
8.20	16.0
5.60	8.0

Test 4 25.3 29.8

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pres (psi)	Comments
1	0	5047.50		9.0	no leaks
	1	5052.50	5.00		
	2	5057.90	5.40		
	3	5062.20	4.30		
	4	5067.20	5.00		
	5	5072.20	5.00		
	6	5077.20	5.00		
	7	5082.10	4.90		
2	0	5089.50		18.0	no leaks
	1	5097.50	8.00		
	2	5105.50	8.00		
	3	5113.50	8.00		
	4	5121.40	7.90		
3	0	5130.70		27.5	no leaks
	1	5140.70	10.00		
	2	5150.90	10.20		
	3	5161.00	10.10		
	4	5171.20	10.20		
	5	5181.4	10.20		
4	0	5189.90		18.0	no leaks
	1	5198.10	8.20		
	2	5206.10	8.00		
	3	5214.30	8.20		
	4	5222.50	8.20		
	5	5230.60	8.10		
	6	5238.70	8.10		
5	0	5245.30		9.0	no leaks
	1	5251.00	5.70		
	2	5256.80	5.80		
	3	5262.60	5.80		
	4	5268.30	5.70		
	5	5274.10	5.80		

Summary 25.3 29.8

Flow rate (gpm)	Pressure (psi)
5.00	9.0
8.00	18.0
10.17	27.5
8.13	18.0
5.77	9.0

Permeability Summary

MPV-04-154c

from	to		Step 1	Step 2	Step 3	Step 4	Step 5	Avg K
16.3	20.8	gauge (psi)	5	10	15	10	5	
		Qavg (igpm)	1.9	6.67	8.36	7.3	4.97	
		K cm/sec	**6.7E-04**	**1.2E-03**	**9.8E-04**	**1.3E-03**	**1.8E-03**	1.2E-03
19.3	23.8	gauge (psi)	6	12	19	12	6	
		Qavg (igpm)	1.4	3	4.1	3.1	1.8	
		K cm/sec	**4.1E-04**	**4.4E-04**	**3.8E-04**	**4.6E-04**	**5.3E-04**	4.4E-04
22.3	26.8	gauge (psi)	8	16	24.5	16	8	
		Qavg (igpm)	4.55	7.7	10	8.2	5.6	
		K cm/sec	**1.0E-03**	**8.5E-04**	**7.2E-04**	**9.0E-04**	**1.2E-03**	9.4E-04
25.3	29.8	gauge (psi)	9	18	27.5	18	9	
		Qavg (igpm)	5	8	10.17	8.13	5.77	
		K cm/sec	**9.8E-04**	**7.8E-04**	**6.5E-04**	**8.0E-04**	**1.1E-03**	8.7E-04
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	#DIV/0!
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	#DIV/0!

Equations:

$Hf = 8.65 \times 10^{-15} (Q^2 * Lp / rp^5)$

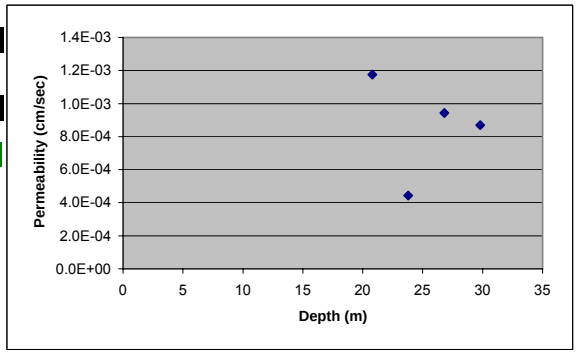
$H_{nit} = (Dw' + Hg - Hf) + Pg/1.42$

$K = (Q * Ln(R/r_b))/2 * \pi * H_{nit} * L)$

Overall 8.6E-04

assume
- vertical drillhole
- water at ground surface
- height of gauge is at rig flr
- negligible friction losses

Dw	Measured depth of static water (1)	*0*	m
Dp	Measured depth to packer		m
Dt	Depth to midpoint of test		m
Inc	Inclination from horizontal	*90*	m
Dw'	Vertical depth to static water level		°
Dp'	Vertical depth to packer		m
Dt'	Vertical depth to midpoint of test		m
Hg	Gauge height	*0*	m
Lp	Length of discharge pipe		m
rp	Radius of discharge pipe (1" = 0.0127m)		m
R	Radius of influence (10m is standard)	10	m
rb	Drillhole radius (HQ=0.048m, NQ=0.038m)	0.038	m
L	Length of test section		m
Hf		0	m



Reflex Readings **MPV-04-154C**

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Field	Temp ©
28-Feb-04	29.8	236.8	88.5	256.4	5942	9.8

UCS SAMPLES

HOLE ID: MPV-04-154C

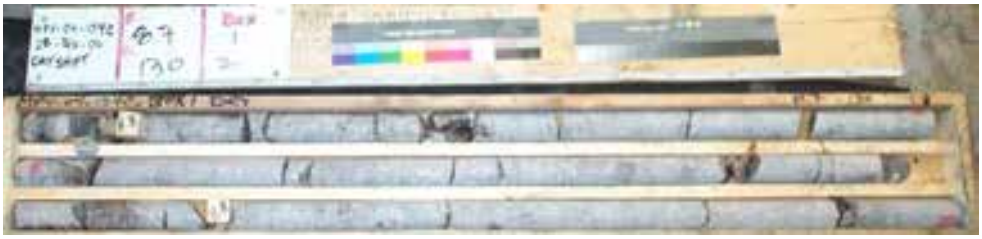
HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-154C	5	28.12-28.37	Granite	04-UCS-154-001

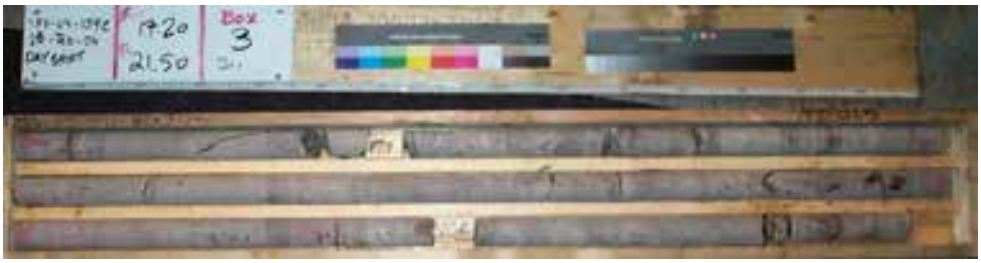
POINT LOAD TEST - INPUT

DRILL HOLE ID: MPV-04-154C

No. #	TESTED BY	DATE	HOLE/ FACE ID	DIST. (m)	ROCK TYPE	TEST TYPE	ORINT	DAYS	W (mm)	D (mm)	P (kN)	COMMENT
1	John Delgaty	##########	MPV-04-154C	27.81	Granite	1				47.50	18.99	Medium grained pink granite - a good clean break
2	John Delgaty	##########	MPV-04-154C	to	Granite	1				47.50	19.27	Medium grained pink granite - a good clean break
3	John Delgaty	##########	MPV-04-154C	28.12	Granite	1				47.50	14.54	Medium grained pink granite - a good clean break
1	John Delgaty	##########	MPV-04-154C	28.37	Granite	1				47.50	15.56	Medium grained pink granite - a good clean break
2	John Delgaty	##########	MPV-04-154C	to	Granite	1				47.50	6.63	Medium grained pink granite - a good clean break
3	John Delgaty	##########	MPV-04-154C	28.63	Granite	1				47.50	21.78	Medium grained pink granite - a good clean break

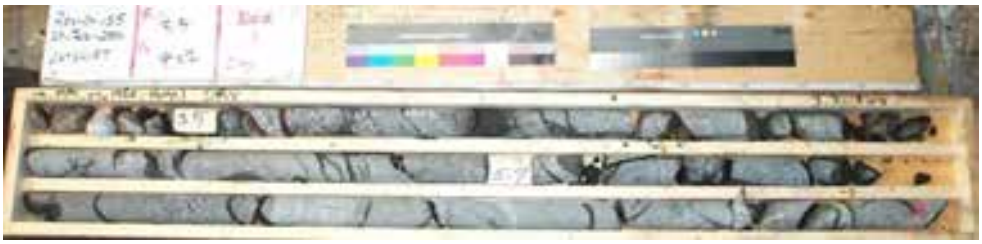
MPV_04_154C

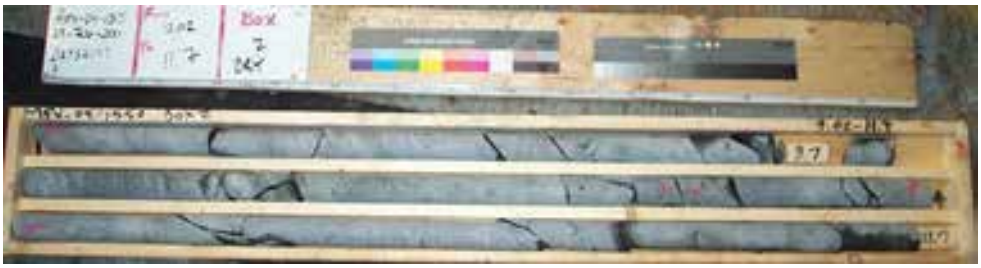


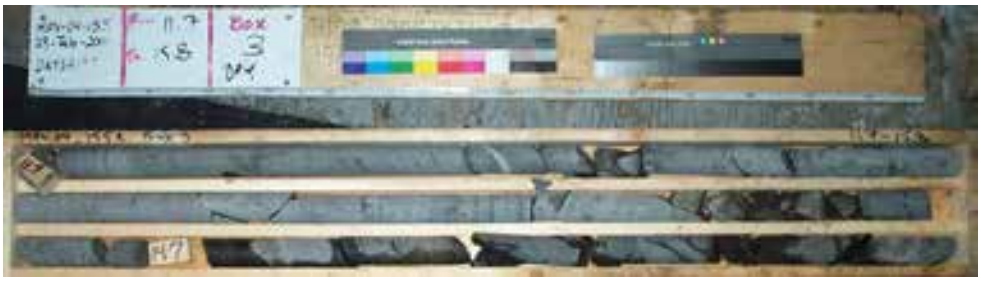


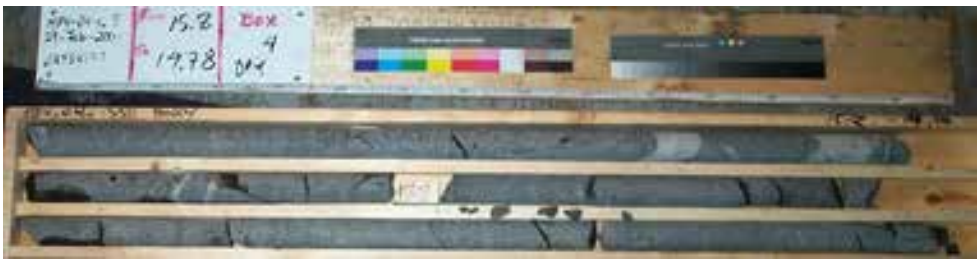
MPV_04_154C

MPV_04_155C

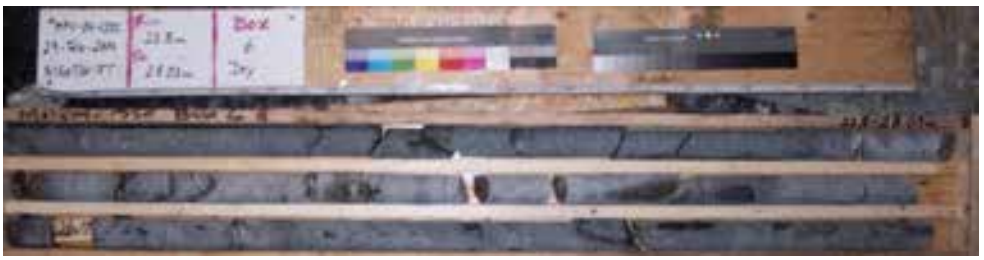








MPV_04_155C



Diary

MPV-04-155c

NS 28/02/2004

2400hrs	move to MPV-04-155C from MPV-04-154C, set-up drill

DS 29/02/2004

0700hrs	Continue setting up drill. Driller does not have HQ adapter. Driller sent for HQ adapter.
	Bernie (BL) arrived after discusion with Mike Waldegger (deBeers) and Peter Dixon (BL). Decided to go with NQ instead of HQ. BL only has three HQ adapters. The other three rigs are currently drilling HQ.
1137hrs	Checked thermistor would fit through NQ. OK.
1140hrs	Start to install casing.
	Ground surface 1.1 m below floor level.
1330hr	Bottom of casing set to 3.8m below floor level. Bedrock at 3.5 m below floor surface.
	end of shift at 29.7m

NS 29/02/2004

2030hrs	drilled to 31.2m
2100hrs	reflex completed
2130hrs	Had to get pipes; Thermistor installed
2300hrs	Rods and casing pulled; pack for move

SRK Consulting
Engineers and Scientists

FIELD DRILL PERFORMANCE LOG

PROJECT	**Gahcho Kue Geotech**
PROJECT NO	**2CD002.11**
NORTHING	7035211
EASTING	588206
SURFACE ELEVATION	407
AZIMUTH	87
DIP	-70

HOLE NO:	**MPV-04-155c**
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	02/29/2004 0:00
FINISH DATE AND TIME	29/02/2004 23:00
HOLE DIAMETER	47.6 (NQ)
DRILLING METHOD	Diamond core

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
NS 1900-0700	B Rameseder	28/02/2004		7	7	0	move to new hole	0	0	0.00	0	0	0	0.00
DS 0700-1900	M Story	29/02/2004		12	6	29.70	No HQ adapter. Wait until decision to use NQ. Set casing. Start drilling	29.7	6	4.95	12	6	6	4.95
NS 1900-0700	B Rameseder	29/02/2004		4	3.5	31.20	Finish hole, install thermistor, reflex, install pipe	1.5	0.5	3.00	16	9.5	6.5	4.80

OVERALL HOLE DRILL RATE (m/hr)	1.36
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	4.80

GENERAL GEOTECH LOG

DRILLHOLE ID: **MPV-04-155c**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
3.50	5.70	2.20	AMP	1.85	84.1	1.60	72.7	1.27	57.7	AMP: amphibolite
5.70	8.70	3.00	AMP	2.90	96.7	2.90	96.7	2.62	87.3	
8.70	11.70	3.00	AMP	3.04	101.3	2.70	90.0	2.70	90.0	
11.70	14.70	3.00	AMP	3.06	102.0	2.70	90.0	2.54	84.7	30 cm of rock fragments.
14.70	17.70	3.00	AMP	3.00	100.0	3.00	100.0	3.00	100.0	From 15.9, bands of Quartz with AMP.
17.70	20.70	3.00	GGRN	2.99	99.7	2.96	98.7	2.66	88.7	GGRN: gneissic granite/mafic rock with pegmatitic sections
20.70	23.70	3.00	GGRN	3.00	100.0	2.98	99.3	2.98	99.3	
23.70	26.70	3.00	GGRN	2.99	99.7	2.98	99.3	2.81	93.7	
26.70	29.70	3.00	GGRN	2.99	99.7	2.99	99.7	2.99	99.7	
29.70	31.20	1.50	AMP	1.56	104.0	1.56	104.0	1.56	104.0	
EOH										

DETAILED GEOTECHNICAL LOG

DRILLHOLE ID: MPV-04-155c

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

FROM	TO	ROCK	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of			JOINT CONDITIONS				COMMENT
(m)	(m)	TYPE	STRONG R	WEAK R	% WEAK	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH	Sets	Type	Totals	ANGLE	ROUGH	ALT	FILL	
5.5	5.7	**AMP**	R4			13	0	6	0		1	0	3	J1	4	65	4	0	1	
														J2	1	55	1	0	1	
														J3	1	65	2	0	1	J1 angles 65,55(2) and 70
5.7	8.7	**AMP**	R4			25	0	13	0		1	0		J1	2	20	8	0	1	
														J2	3	60	7	0	1	
														J3	8	65	4	0	1	
8.7	11.7	**AMP**	R3			15	0	7	0		1	0	3	J1	4	60	5	0	9	
														J2	2	55	2	0	9	
														J3	1	70	4	0	9	
11.7	14.7	**AMP**	R4			18	0	8	0		1	0	3	J1	6	50	5	0	9	
														J2	1	65	3	0	9	
														J3	1	80	4	0	9	(2) J1 had fill of 2
14.7	17.7	**AMP***	R4			11	0	4	0		1	0	3	J1	2	60	5	0	9	
														J2	1	65	5	0	1	
														J3	1	60	4	0	9	
17.7	20.7	**GGRN**	R4			19	0	11	0		1	0	3	J1	8	60	4	0	1	
														J2	2	80	2	0	1	
														J3	1	40	7	0	1	J1 angles 55 to 70.
20.7	23.7	**GGRN**	R4			21	0	6	0	0	1	1	3	J1	2	35	5	0	1	
														J2	3	30	4	0	1	
														J3	1	30	1	0	3	J2 angles 30, 60,80
23.7	26.7	**GGRN**	R4			24	0	8	1	1	1	1	3	J1	5	55	5	0	3	
														J2	1	35	7	1	3	fills are generally calcite or hematite; joint set 2 shows about 2mm o
														J3	2	45	7	0	3	brownish alteration on the rockwall; hematite stains on the sides following join
26.7	29.5	**GGRN**	R4			14	0	4	0	0	1	0	3	J1	1	15	5	0	3	
														J2	2	35	2	0	3	
														J3	1	55	7	0	3	
29.5	31.2	**AMP**	R5			6	0	3	0	0	1	0	3	J1	1	45	7	0	9	
														J2	1	50	5	0	3	
														J3	1	25	2	0	3	Joint set 3: calcite and chlorite coating on joint surfac
EOH																				

Photo Record

MPV-04-155c

Date	Shift	Filename	Depth	Description
29-Feb-04	DS 0700-1900	MPV-04-155C-3.3mbox1	3.3m - 7.02m	
29-Feb-04	DS 0700-1900	MPV-04-155C-7.02m_box2	7.02m - 11.7m	
29-Feb-04	DS 0700-1900	MPV-04-155C-11.7m_box3	11.7 - 15.8	
29-Feb-04	DS 0700-1900	MPV-04-155C-15.8m_box4	15.8 - 19.78	
29-Feb-04	NS 1900-0700	MPV-04-155C-19.78m_box5	19.78-23.8m	
29-Feb-04	NS 1900-0700	MPV-04-155C-23.8m_box6	23.8-28.03m	
29-Feb-04	NS 1900-0700	MPV-04-155C-28.03m_box7	28.03-31.2m	EOH

Core Box Record

MPV-04-155c

Box	From	To	Comments
1	3.03	7.02	
2	7.02	11.70	
3	11.70	15.80	
4	15.80	19.78	
5	19.78	23.80	
6	23.80	28.03	
7	28.03	31.20	EOH
8			
9			
10			
11			
12			

Thermistor Readings

MPV-04-155c

Thermistor String ID **32/16-7**

Thermis Node	Reading (kOhms)	Comments
1	15.65	
2	13.56	
3	14.84	
4	14.37	
5	14.53	
6	14.21	
7	13.49	
8	13.35	
9	14.74	
10	14.15	
11	14.66	
12	13.50	
13	13.79	
14	13.17	
15	14.18	
16	14.34	

Reflex Readings **MPV-04-155C**

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N	Magnetic Field	Temp ©
Feb 29,2004	31.2	65.6	70	51.7	5788	12.1

FIELD GEOLOGICAL LOG

HOLE ID MPV-04-155c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	1.10	Snow/ice		Snow/ice	MS
1.1	3.5	OVB		Overburden	MS
3.5	14.7	AMP		Amphibolite (hb) with digested granite xenoliths and granitic dyklets ;amphibolite : dark green, coarse to medium grained; local biotite rich zones associate with granitic xenoliths	MS
14.70	29.50	GGRN		Gneissic granite: biotite rich, biotite shows some regulation/foliation; dark grey; compact; joint often filled with calcite and hematite; hematite stains in granite; granite is medium grained; pegmatitic sections throughout core; towards end of hole (last 3m) amphibolitic	MS/BR
29.50	31.20	AMP		Amphibolite: See above: pyrite at 29.8m	BR
EOH					

UCS SAMPLES

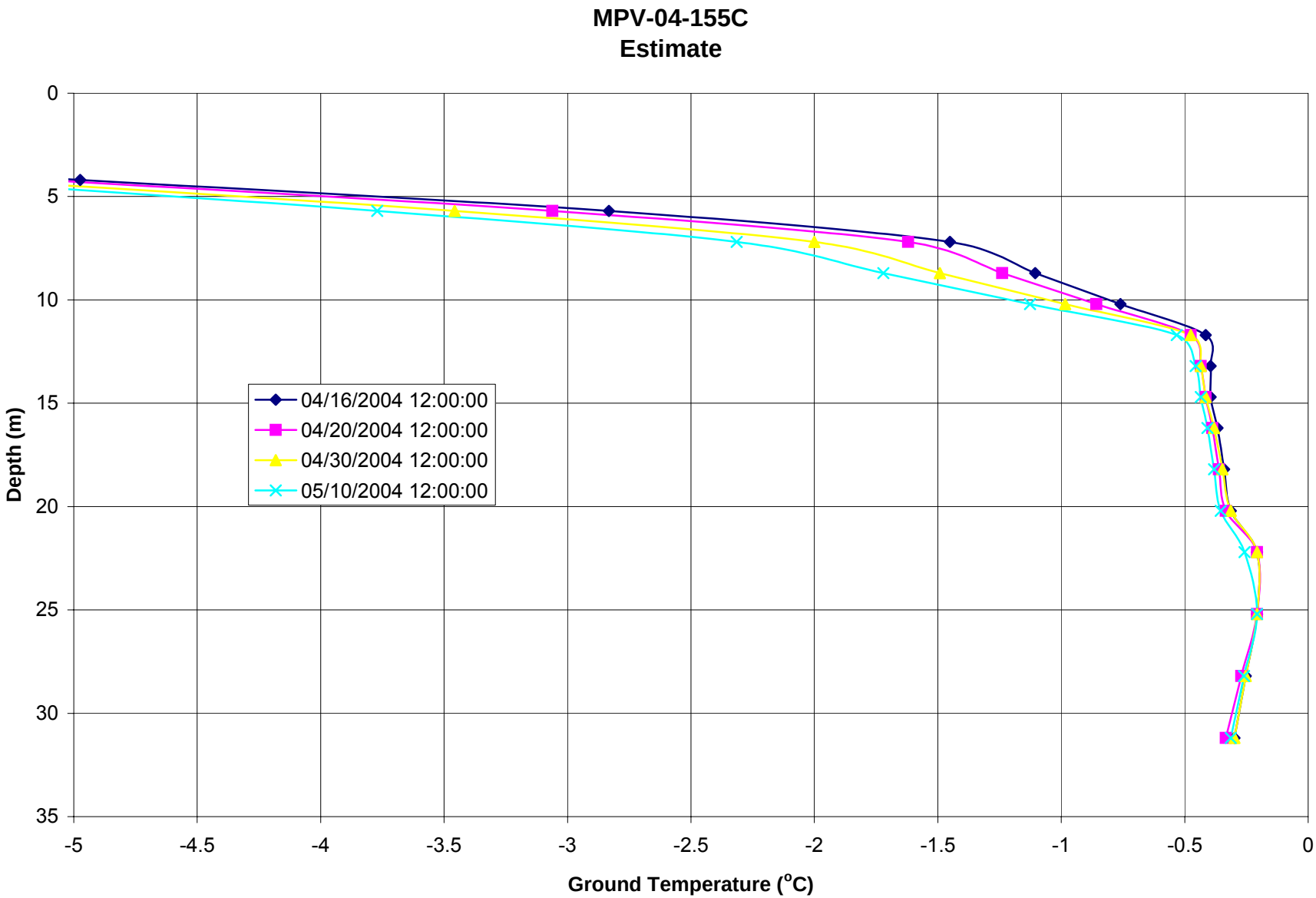
HOLE ID: MPV-04-155C

HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-155C	5	21.56-21.91	Granite/Diorite	04-UCS-155-001
MPV-04-155C	7	28.67-28.98	Granite	04-UCS-155-002

POINT LOAD TEST - INPUT

DRILL HOLE ID: **MPV-04-155C**

No. #	Tested by	DATE	HOLE/ FACE ID	DIST. (m)	ROCK TYPE	TEST TYPE	ORINT	DAYS	W (mm)	D (mm)	P (kN)	COMMENT
1	John Delgaty	##############	MPV-04-155C	21.13	Diorite	1				47.60	20.03	Grey, fine to medium diorite - a good clean break
2	John Delgaty	##############	MPV-04-155C	to	Diorite	1				47.60	10.90	Grey, fine to medium diorite - split oblique to the core axis
3	John Delgaty	##############	MPV-04-155C	21.56	Diorite	1				47.60	19.72	Grey, fine to medium diorite - a good clean break
1	John Delgaty	##############	MPV-04-155C	21.91	Diorite	1				47.60	7.80	Grey, fine to medium diorite - broke on a plane of weakness
2	John Delgaty	##############	MPV-04-155C	to	Diorite	1				47.60	11.53	Grey, fine to medium diorite - a good clean break
3	John Delgaty	##############	MPV-04-155C	22.19	Diorite	1				47.60	13.41	Grey, fine to medium diorite - a good clean break
1	John Delgaty	##############	MPV-04-155C	28.31	Granite	1				47.50	6.19	Coarse pink/grey granite - a good clean break
2	John Delgaty	##############	MPV-04-155C	to	Granite	1				47.50	9.09	Coarse pink/grey granite - a good clean break
3	John Delgaty	##############	MPV-04-155C	28.67	Granite	1				47.50	16.86	Coarse pink/grey granite - a good clean break
1	John Delgaty	##############	MPV-04-155C	28.98	Granite	1				47.50	7.89	Coarse pink/grey granite - a good clean break
2	John Delgaty	##############	MPV-04-155C	to	Granite	1				47.50	17.62	Coarse pink/grey granite - a good clean break
3	John Delgaty	##############	MPV-04-155C	29.11	Granite	1				47.50	18.84	Coarse pink/grey granite - a good clean break


MPV-04-155C
Estimate
Depth (m)
0
5
10
15
20
25
30
35
-5
-4.5
-4
-3.5
-3
-2.5
-2
-1.5
-1
-0.5
0
Ground Temperature (°C)
04/16/2004 12:00:00
04/20/2004 12:00:00
04/30/2004 12:00:00
05/10/2004 12:00:00

MPV_04_156C

MPV_04_156C

Diary

MPV-04-156c

NS 29/02/2004

	packing at MPV-04-155c and move to new site on dyke 6

DS 1/03/2004

	set up water lines. Water line to flood area for next abutment hole. Weather very cold -
700hrs	36 C.
	Bury waterlines. Numerous problems with freezing equipment (eg. Water swivel, guages etc.).
	Casing set to 2.1 below floor level. Bedrock at 1.5m. Ground level at 1.0m
1500hrs	at 4.2m. Changed drill bit.
1700hrs	lost water return at 7.5 m.
	end of shift 14.7m

NS 1/03/2004

2130hrs	drilled to 20.7m
2330hrs	drilled to 26.7m
	had to change gauge at drill as the other
0000hrs	one was frozen
0230hrs	31.5m
	looking for reflex and all its parts (drill 4 is moving at same time)
	Extreme cold weather conditions keep freezing the gauge (water pressure) at the drill
	reflex reading is taken, thermistor is
0530hrs	installed
	pull rods and casing

Checklist - delete before finalizing and printing file

reflex??
thermistor?
protective pipe?
grouted?
staked?
summary updated?
point load test samples selected?

SRK Consulting
Engineers and Scientists

FIELD DRILL PERFORMANCE LOG

PROJECT	**Gahcho Kue Geotech**
PROJECT NO	**2CD002.11**
NORTHING	7035377
EASTING	591530
SURFACE ELEVATION	405
AZIMUTH	327
DIP	-70

HOLE NO:	**MPV-04-156c**
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	03/01/2004 0:00
FINISH DATE AND TIME	02/03/2004 7:00
HOLE DIAMETER	47.6 (NQ)
DRILLING METHOD	Diamond core

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
NS 1900-0700	B Rameseder	29/2/2004		7	7	0	Pack drill and move to dyke 6	0	0	0.00	0	0	0	0.00
DS 0700-1900	M Storey	01/03/2004		12	7.5	14.70	Finish set-up; Numerous problems associated with freezing.	14.7	4.5	3.27	12	7.5	4.5	3.27
NS 1900-0700	B Rameseder	01/03/2004		12	6	31.20	finished hole, reflex, thermistor installation	16.5	6	2.75	24	13.5	10.5	2.97

OVERALL HOLE DRILL RATE (m/hr)	1.01
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	2.97

GENERAL GEOTECH LOG

DRILLHOLE ID: **MPV-04-156c**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
1.00	1.50	0.50	OVBN							
1.50	4.50	3.00	GRN	2.30	76.7	0.90	30.0	0.60	20.0	Granite, Run contains numerous fragments.
4.50	5.70	1.20	GRN	1.30	108.3	0.80	66.7	0.55	45.8	
5.70	8.70	3.00	GRN	3.06	102.0	2.30	76.7	2.10	70.0	Granite, Run contains numerous fragments.
8.70	9.60	0.90	GRN	0.95	105.6	0.78	86.7	0.74	82.2	
9.60	11.70	2.10	GRN	2.12	101.0	2.08	99.0	2.08	99.0	Granite, **broken on cemented joints and microdefects along core axis**
11.70	14.70	3.00	GRN	3.01	100.3	3.01	100.3	3.01	100.3	
14.70	17.70	3.00	GRN	2.98	99.3	2.95	98.3	2.95	98.3	
17.70	20.70	3.00	GRN	3.00	100.0	2.95	98.3	2.95	98.3	magnetite? In granite
20.70	23.70	3.00	GRN	3.02	100.7	2.93	97.7	2.83	94.3	
23.70	26.70	3.00	GRN	3.01	100.3	2.95	98.3	2.95	98.3	in core barrel
26.70	27.56	0.86	GRN	0.86	100.0	0.86	100.0	0.76	88.4	Handling broke many microdefects
27.56	27.95	0.39	GRN	0.50	128.2	0.25	64.1	0.25	64.1	Handling broke many microdefects, defects parallel to core axis
27.95	29.70	1.75	GRN	1.79	102.3	1.79	102.3	1.70	97.1	Handling broke many microdefects, cemented joints,**weathered zone at 28.51-28.61; feldspars change to kaolinit; granite changes to pegmatite**
29.70	31.20	1.50	GRN	1.52	101.3	1.52	101.3	1.52	101.3	Handling broke many microdefects
EOH										
		0.00								

DETAILED GEOTECHNICAL LOG

DRILLHOLE ID: **MPV-04-156c**

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

FROM (m)	TO (m)	ROCK TYPE	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of Sets	Type	Totals	JOINT CONDITIONS				COMMENT
			STRONG R	WEAK R	% WEAK	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH				ANGLE	ROUGH	ALT	FILL	
1.5	4.5	**GRN**	R6			15	0	6	0	0	1	0	3	J1	4	60	4	0	1	
														J2	1	75	5	0	1	
														J3	1	50	2	0	9	Jl angles: (3) 60, (1) 75.
4.5	5.7	**GRN**	R6			16	0	7	0	0	1	0	3	J1	5	65	4	0	1	
														J2	1	50	2	0	1	
														J3	1	60	6	0	4	
5.7	8.7	**GRN**	R5			27	0	14	0	0	1	0	3	J1	9	36	5	0	2	
														J2	3	40	2	0	2	
														J3	2	40	9	0	1	J2 angles: 75, 40, 25. J4 angles from 50 to 70; rough 4;alt 0;fill1.
8.7	9.6	**GRN**	R5			7	0	4	0	0	1	0	3	J1	2	25	8	0	1	
														J2	1	50	5	0	1	
														J3	1	70	4	0	1	
9.6	11.7	**GRN**	R4			8	0	3	3	1	2	1	2	J1	2	35	7	0	9	
														J2	1	25	2	0	3	
																				microdefects and cemented joint filled with dark green coating; some cemented joints also with calcite
11.7	14.7	**GRN**	R5			10	0	2	1	1	2	1	2	J1	1	80	7	0	3	
														J2	1	25	7	0	3	
																				Microdefects also along core axis
14.7	17.7	**GRN**	R5			10	0	3	1	1	2	1	3	J1	1	35	7	0	3	
														J2	1	15	2	0	3	
														J3	1	20	7	0	3	Joint set 1: chlorite filling; quartz at joint with chlorite (very small string
17.7	20.7	**GRN**	R5			14	0	6	0	0	1	0	3	J1	2	40	5	0	9	
														J2	2	35	2	0	2	
														J3	1	55	2	0	3	**joint set 5: 1 joint angle 20, rough 1, fill 0, alt 2 (very small filled fi**
20.7	23.7	**GRN**	R5			15	0	6	2	1	2	1	3	J1	2	55	2	0	3	
														J2	2	70	5	0	2	
														J3	2	20	4	0	3	Joint set 1: brownish-green coating; joint set 2: 0.1-0.5cm of quartz an
23.7	26.7	**GRN**	R4			16	0	6	5	1	2	1	2	J1	5	50	7	0	3	
														J2	1	30	7	0	3	
																				microdefects and cemented joints broken up; many of these filled with chlorite (green) and broken mup due to handling (frozen core)
26.7	27.6	**GRN**	R4			5	0	3	0	0	1	0	2	J1	2	25	5	0	3	
														J2	1	45	5	0	3	
27.6	28.0	**GRN**	R4																	broken up microdefects parallel to core axis, broke due to handling
28.0	29.7	**GRN**	R4			17	0	4	1	1	1	1	3	J1	2	55	7	0	9	
														J2	1	15	2	0	9	**Joint set 4: 1joint, angle 20, rough 5, fill 8 (clayey, quartz and**
														J3	1	30	5	0	5	**chlorite on joint and clay- weathered feldspars)**
29.7	31.2	**GRN**	R4			16	0	3	3	1	1	1	3	J1	1	15	7	0	9	
														J2	1	75	5	0	9	
														J3	1	60	5	0	3	
EOH																				

Photo Record

MPV-04-156c

Date	Shift	Filename	Depth	Description
1-Mar-04	DS 0700-1900	MPV-04-156C-1mbox1	1m - 5.5m	
1-Mar-04	DS 0700-1900	MPV-04-156C-5.5mbox2	5.5 - 8.7	
1-Mar-04	NS 1900-0700	MPV-04-156C-8.7mbox3	8.7-12.7m	
1-Mar-04	NS 1900-0700	MPV-04-156C-12.7mbox4	12.7-17.11m	
1-Mar-04	NS 1900-0700	MPV-04-156C-17.11mbox5	17.11-21.2m	
1-Mar-04	NS 1900-0700	MPV-04-156C-21.2mbox6	21.2-25.58m	
1-Mar-04	NS 1900-0700	MPV-04-156C-25.58mbox7	25.58-29.6m	
1-Mar-04	NS 1900-0700	MPV-04-156C-29.6mbox8	29.6-31.2m	EOH

Core Box Record **MPV-04-156c**

Box	From	To	Comments
1	1.00	5.50	
2	5.50	8.70	
3	8.70	12.70	
4	12.70	17.11	
5	17.11	21.20	
6	21.20	25.58	
7	25.58	29.60	
8	29.60	31.20	EOH

Thermistor Readings

MPV-04-156c

Thermistor String ID **32/16-14**

Thermis Node	Reading (kOhms)	Comments
1	14.24	
2	13.51	
3	12.64	
4	13.00	
5	12.55	
6	13.58	
7	13.08	
8	13.53	
9	12.86	
10	12.70	
11	13.05	
12	12.99	
13	13.03	
14	12.83	
15	13.20	
16	13.78	

Reflex Readings **MPV-04-156C**

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Field	Temp ©
02-Mar-04	31.2	315.1	69.5	350.1	5968	7.8

FIELD GEOLOGICAL LOG

HOLE ID MPV-04-156c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	1.00	Snow, ice			MS
1.00	1.50	Overburden		tundra, small boulders cobbles.	MS
1.5	31.2	Granite		Granite: light coloured, (pink) medium grained, compact, hematite stained, chlorite in microdefects and cemented joints - coarse grained pegmatite present; at about 20m depth: magnetite? (crystals about 0.5-2cm large); at 28.51-28.61: granit weathered- feldspars change to kaolinite; pegmatitic section at 29-29.3m (large quantity of quartz)	MS/BR
EOH					

UCS SAMPLES

HOLE ID: MPV-04-156C

HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-156C	6	23.04-23.34	Granite	04-UCS-156-001

POINT LOAD TEST - INPUT

DRILL HOLE ID: MPV-04-156C

No. #	TESTED BY	DATE	HOLE/ FACE ID	DIST. (m)	ROCK TYPE	TEST TYPE	ORINT	DAYS	W (mm)	D (mm)	P (kN)	COMMENT
1	John Delgaty	##########	MPV-04-156C	22.88	Granite	1				47.20	18.84	Medium grained pink granite - clean break
2	John Delgaty	##########	MPV-04-156C	to	Granite	1				47.20	23.96	Medium grained pink granite - clean break
3	John Delgaty	##########	MPV-04-156C	23.04	Granite	1				47.20	21.81	Medium grained pink granite - clean break
1	John Delgaty	##########	MPV-04-156C	23.34	Granite	1				47.20	21.84	Medium grained pink granite - clean break
2	John Delgaty	##########	MPV-04-156C	to	Granite	1				47.20	5.48	Medium grained pink granite - broke along a fracture
3	John Delgaty	##########	MPV-04-156C	23.47	Granite	1				47.20	10.78	Medium grained pink granite - clean break

GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	*DESCRIPTION*	*Mpa*
R0	EXTREMELY WEAK ROCK	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	VERY WEAK ROCK	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	WEAK ROCK	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	MEDIUM STRONG ROCK	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	STRONG ROCK	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	VERY STRONG ROCK	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	EXTREMELY STRONG ROCK	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY	
CODE	*DESCRIPTION*
0	NONE
1	MINOR
2	MODERATE
3	HEAVY

DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	*CATEGORY*
0	STRONG (NEVER BREAKS)
1	MODERATE (SOMETIMES BREAKS)
3	WEAK (ALWAYS BREAKS)

JOINT CONDITION - SMALL SCALE		
CODE	*CATEGORY*	*SUBCATEGORY*
1	STEPPED	ROUGH
2		SMOOTH
3		SLICKENSIDED
4	UNDULATING	ROUGH
5		SMOOTH
6		SLICKENSIDED
7	PLANAR	ROUGH
8		SMOOTH
9		SLICKENSIDED

JOINT FILLING		
CODE	*CATEGORY*	*SUBCATEGORY*
1	NON	COARSE
2	SOFTENING	MEDIUM
3		FINE
4	SOFT	COARSE
5	SHEARED	MEDIUM
6		FINE
7	GOUGE THIKNESS < IRREGULARITIES	
8	GOUGE THIKNESS > IRREGULARITIES	
9	NO INFILL	

JOINT ALTERATION	
CODE	*DESCRIPTION*
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE

Laubscher	Jr	JRC
1	4	20
2	3	14
3	2	11

STEPPED

4	3	14
5	2	11
6	1.5	7

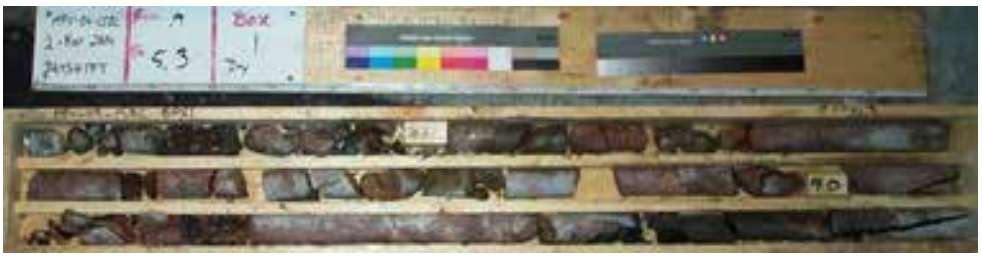
UNDULATING

7	1.5	2.5
8	2	1.5
9	0.5	0.5

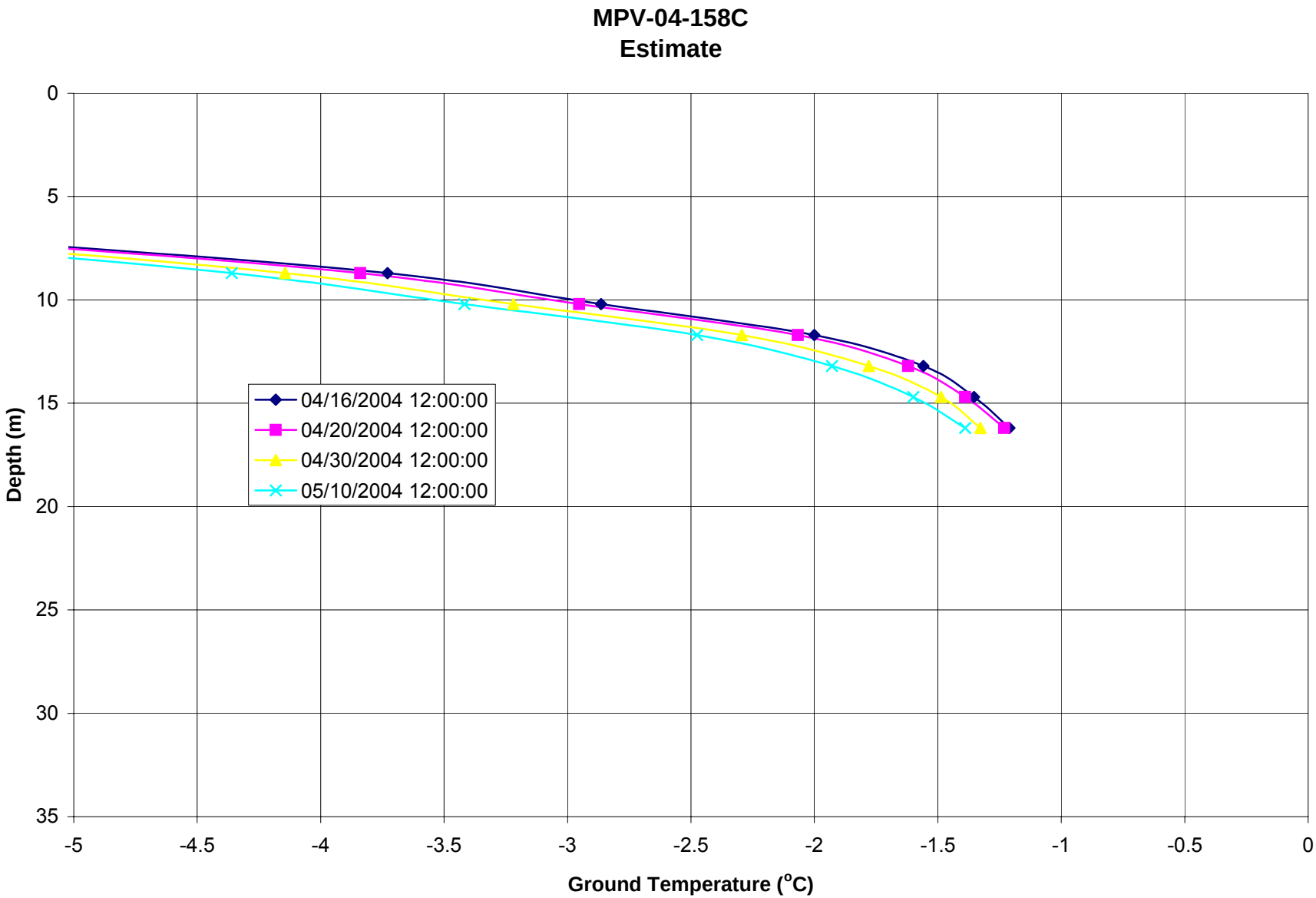
PLANAR

STEFFEN, ROBERTSON AND KIRSTEN
Consulting Engineers

MPV_04_158C



MPV_04_158C


MPV-04-158C
Estimate
Depth (m)
0
5
10
15
20
25
30
35
-5
-4.5
-4
-3.5
-3
-2.5
-2
-1.5
-1
-0.5
0
Ground Temperature (°C)
04/16/2004 12:00:00
04/20/2004 12:00:00
04/30/2004 12:00:00
05/10/2004 12:00:00

Diary

MPV-04-158c

NS 1/03/2004

	ready to move

DS 2/03/2004

	Move rig, reconnect water lines, bury water
0700hrs	lines set up rig.
1430hrs	Start installing casing.
	Casing at 2.3m below floor level. Ground surface at 0.9 m below floor. Bedrock at 2.0
1730hrs	m below floor.
1900hrs	drilled to 8.7m

NS 2/03/2004

	coil stove is not working properly
2100hrs	11.7m
	water lines and sludge are frozen sucking lines frozen; pump shack had to be moved and new hole in ice drilled with ice auger; water swifel and rods frozen

DS 3/03/2004

0700hrs	Rods frozen in hole. Cannot taken them out.
0930hrs	Peter Dixon foreman of BL came out to assist drillers.
1030hrs	Rods still frozen in hole. Peter Dixon decide to unscrew rods and take casing down to 11.7m to break up ice around rod. Peter went back to camp to get new shoe.
1130hrs	Water line froze. Drillers replaced it. End of shift: drill worked but rods still frozen

NS 3/03/2004

	rods and casing thawn out; 11.1 m of total
0000hrs	casing (drilled over rods)
0100hrs	drilled to 14.7m
0145hrs	drilled to 17.7m
0400hrs	drilled to 23.7m
0415hrs	pull rods to change bit
0500hrs	bit changed; cave-in; ream hole to get back to bottom; hole froze when changing the bit
0630hrs	ready to continue

DS 4/03/2004

0700hr	continue drilling
0930hr	EOH at 31.2m below floor level.
1000hr	take reflex
1120hr	Thermistor installed.
	Unable to put casing over thermistor. Placed
1210hr	stake next to Thermistor.

SRK Consulting
Engineers and Scientists

FIELD DRILL PERFORMANCE LOG

PROJECT	**Gahcho Kue Geotech**
PROJECT NO	**2CD002.11**
NORTHING	7035359
EASTING	591539
SURFACE ELEVATION	405
AZIMUTH	327
DIP	-70

HOLE NO:	**MPV-04-158c**
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	03/02/2004 7:00
FINISH DATE AND TIME	03/04/2004 11:30
HOLE DIAMETER	47.6 (NQ)
DRILLING METHOD	Diamond core

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
DS 0700-1900	M Storey	02/03/2004		12	7.5	8.7	Move rig, set-up, casing, start drilling	8.7	4.5	1.93	12	7.5	4.5	1.93
NS 1900-0700	B Rameseder	02/03/2004		12	10.5	11.70		3	1.5	2.00	24	18	6	1.95
DS 0700-1900	M Storey	03/03/2004		12	12	11.70	Rods frozen in hole.	0	0	#DIV/0!	36	30	6	1.95
NS 1900-0700	B Rameseder	03/03/2004		12	8	23.70	rods and casing thawn after freezing the previous day, hole started partially to freeze after bit change, drilled to 23.7m	12	4	3.00	48	38	10	2.37
DS 0700-1900	M Storey	04/03/2004		4.5	0.5	31.20	Install thermistor	7.5	4	1.88	52.5	38.5	14	2.23

OVERALL HOLE DRILL RATE (m/hr)	0.59
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	2.23

GENERAL GEOTECH LOG **DRILLHOLE ID:** **MPV-04-158c**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
0.90	2.00	1.10	OVB							OVB - overburden - small cobbles coarse gravel.
2.00	4.00	2.00	GRN	1.84	92.0	1.68	84.0	1.40	70.0	GRN - pink granite, medium grained, some large grained pegmatite.
4.00	5.70	1.70	GRN	1.75	102.9	1.75	102.9	1.75	102.9	
5.70	6.75	1.05	GRN	1.07	101.9	1.05	100.0	0.95	90.5	
6.75	6.87	0.12	GRN	0.12	100.0					broken up rock
6.87	8.70	1.83	GRN	1.92	104.9	1.92	104.9	1.92	104.9	
8.70	11.70	3.00	GRN	2.99	99.7	2.99	99.7	2.99	99.7	
11.70	14.70	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
14.70	17.70	3.00	GRN	2.96	98.7	2.96	98.7	2.92	97.3	compact pegmatite
17.70	20.70	3.00	GRN	2.98	99.3	2.98	99.3	2.98	99.3	
20.70	22.85	2.15	GRN	2.15	100.0	2.15	100.0	2.10	97.7	
22.85	23.37	0.52	GRN	0.52	100.0					broken into pieces due to mechanical breaks and cemented fractures, microdefects parallel to core axis
23.37	23.70	0.33	GRN	0.38	115.2	0.38	115.2	0.38	115.2	
23.70	26.70	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	Mechanical breaks only. Some mechanincal breaks along axis.
26.70	29.70	3.00	GRN	3.02		3.02		3.02		
29.70	30.03	0.33	GRN							Rock fragments due to mechanical breakage.
30.03	31.20	1.17	GRN	1.20	102.6	1.20	102.6	1.20	102.6	EOH

DETAILED GEOTECHNICAL LOG DRILLHOLE ID: **MPV-04-158c**

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

FROM	TO	ROCK	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of			JOINT CONDITIONS				COMMENT
(m)	(m)	TYPE	STRONG R	WEAK R	% WEAK	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH	Sets	Type	Totals	ANGLE	ROUGH	ALT	FILL	
2.0	4.0	GRN	R4			18	0	7	0		1	0	3	J1	5	70	4	0	1	
														J2	1	50	2	0	6	
														J3	1	75	2	0	1	J1 angles: 55, 70, 75
4.0	5.7	GRN	R6			7	0	4	1	0	1	0	3	J1	1	80	3	0	9	
														J2	2	60	4	0	1	
														J3	1	65	2	0	6	JI angles: 60 and 65
5.7	6.8	GRN	R5			15	0	6	0		2	1	3	J1	1	30	2	0	9	
														J2	3	25	2	0	3	
														J3	1	50	5	0	3	Joint set 4: angle 30, rough 5, alt 0, fill
6.8	6.9	GRN	R4				0													
																				broken material due to handling and quantity of microdefects and jo
6.9	8.7	GRN	R5			13	0	2	0		1	1	2	J1	1	10	3	0	3	
														J2	1	30	1	0	3	
8.7	11.7	GRN	R5			13	0	2	0		1	0	1	J1	2	25	4	0	9	
11.7	14.7	GRN	R5	R4	20	29	0	4	0		1	0	3	J1	1	20	4	0	3	
														J2	1	25	4	0	3	
														J3	1	10	5	0	9	joint set 4 : 1 joint, angle 30, rough 7, alt 0, fill 3; gneissic parts; mechanically used part
14.7	17.7	GRN	R5			13	0	1	2	0	1	0	1	J1	1	10	5	0	3	
																				compact pegmatitic section
17.7	20.7	GRN	R5			19	0	2	1	1	0	0	2	J1	1	25	7	0	3	
														J2	1	30	5	0	2	
																				cemented joint in 50 degree angle; fill about 0.2-0.4mm of dark green material, compact, no alteration, chlorite'
20.7	22.9	GRN	R5			17	0	6	4	1	1	1	3	J1	2	10	7	0	9	
														J2	1	40	2	0	3	
														J3	1	60	4	0	3	Joint set 4:2 joints , angle 45, rough 5, alt 0, fill
22.9	23.4	GRN	R5																	
																				broken material due to handling and quantity of microdefects and jo along core axis
23.4	23.7	GRN	R5			6	0	2	2	1	1	1	3	J1	1	50	2	0	3	
														J2	1	15	3	0	3	
23.7	26.7	GRN	R4			20	0	1	3	1	1	1	1							
																				Mechanical breaks only.
26.8	29.7	GRN	R4			18	0	3	0	0	1	0	1	J1	3	65	9	0	6	
																				One joint has no joint fill.
29.7	31.2	GRN	R6			6	0	2	0	0	1	0	2	J1	1	70	3	0	9	
														J2	1	30	5		3	
																				EOH

Photo Record

MPV-04-158c

Date	Shift	Filename	Depth	Description
3-Mar-04	DS 0700-1900	MPV-04-158C-.9mbox1	0.9m - 5.3m	
3-Mar-04	NS 1900-0700	MPV-04-158C-5.3mbox2	5.3m - 9.37m	
3-Mar-04	NS 1900-0700	MPV-04-158C-9.37mbox3	9.37-13.59m	
3-Mar-04	NS 1900-0700	MPV-04-158C-13.59mbox4	13.59-17.8m	
3-Mar-04	NS 1900-0700	MPV-04-158C-17.8mbox5	17.8-22.08m	
3-Mar-04	NS 1900-0700	MPV-04-158C-22.08mbox6	22.08m- 23.7m	
4-Mar-04	DS 0700-1900	MPV-04-158C-23.7mbox7	23.7m - 27.72m	
4-Mar-04	DS 0700-1900	MPV-04-158C-27.72mboxE	27.72m - 31.2m EOH	

Core Box Record

MPV-04-158c

Box	From	To	Comments
1	0.9m	5.3m	
2	5.3m	9.37m	
3	9.37m	13.59m	
4	13.59m	17.8m	
5	17.8m	22.08m	
6	22.08m	23.7m	
7	23.7m	27.72m	
8	27.72m	31.2m	EOH
9			
10			
11			
12			

Thermistor Readings

MPV-04-158c

Thermistor String ID **32/16-16**

Thermis Node	Reading (kOhms)	Comments
1	16.65	
2	14.63	
3	14.60	
4	14.89	
5	14.84	
6	14.80	
7	15.00	
8	15.18	
9	14.47	
10	15.21	
11	14.46	
12	14.80	
13	15.32	
14	14.86	
15	14.89	
16	14.76	

Reflex Readings **MPV-04-158C**

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Field	Temp ©
04-Mar-04	31.2	317.3	69.4	134.6	6001	10.4

FIELD GEOLOGICAL LOG

HOLE ID MPV-04-158c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	0.90	Ice/snow		Ice/snow	MS
0.9	2.00	Overburden		Overburden: small cobbles coarse gravel	MS
2.00	31.2 (EOH)	Granite		Granite: pink granite, hematite stains, broken due to fractures; medium grained, some large grained pegmatite; at 8.5m: magnetite crystals up to 0.5cm; at 12- 13m gneissic sections; at 15.5-17.5m pegmatitic; at 22.0-23.7 mafic mineral content higher	MS/BR

UCS SAMPLES

HOLE ID: MPV-04-158C

HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-158C	7	24.57	GRANITE	04-UCS-158-001

POINT LOAD TEST - INPUT

DRILL HOLE ID: MPV-04-158C

No. #	Tested by	DATE	HOLE/ FACE ID	DIST. (m)	ROCK TYPE	TEST TYPE	ORINT	DAYS	W (mm)	D (mm)	P (kN)	COMMENT
1	John Delgaty	##############	MPV-04-158C	24.79	Granite	1				47.40	9.96	Medium pink/white granite - a good clean break
2	John Delgaty	##############	MPV-04-158C	to	Granite	1				47.40	10.54	Medium pink/white granite - a good clean break
3	John Delgaty	##############	MPV-04-158C	24.57	Granite	1				47.40	6.29	Medium pink/white granite - a good clean break
1	John Delgaty	##############	MPV-04-158C	24.86	Granite	1				47.40	7.34	Medium pink/white granite - a good clean break
2	John Delgaty	##############	MPV-04-158C	to	Granite	1				47.40	9.13	Medium pink/white granite - a good clean break
3	John Delgaty	##############	MPV-04-158C	25.04	Granite	1				47.40	10.81	Medium pink/white granite - a good clean break

MPV_04_160C

Diary

MPV-04-160c

DS 04/03/2004

	Prepare rig for move from previous location.
1230hrs	Wait for loader to arrive.
1730hrs	Rig, shack etc. in new location at D1-GB-1.

NS 04/03/2004

2130hrs	1.6m ice
	casing to 3.8m lake bottom start drilling ahead in order to get sediments no recovery
	hole depth 9m, casing 6.5m; advance
2300hrs	additional casing to bedrock
0015hrs	casing added to 9m
0300hrs	drilled to 11.9m
0445hrs	drilled to 17.9m
	pull rods, prepare packer
	pressure gauge at flow meter was not working, had to get replacement
0620hrs	start packer
0645hrs	finish 1st packer tes;t no water flow due to frozen ground/permafrost?

DS 05/03/2004

700hrs	Continue drilling.
0930hrs	Set up for packer testing at 16.4 - 20.9m.
1030hrs	packer testing completed.
1215hr	Set up for packer testing at 19.4 - 23.9m.
1315hr	packer testing completed.
1445hr	Set up for packer testing at 22.4 - 26.9m.
1545hr	packer testing completed.
	finish drilling to 29.9m and packer test at last interval

NS 05/03/2004

1945hrs	reflex test finished
	cemented hole
2200hrs	start packing

SRK Consulting
Engineers and Scientists

FIELD DRILL PERFORMANCE LOG

PROJECT	**Gahcho Kue Geotech**
PROJECT NO	**2CD002.11**
NORTHING	7035413
EASTING	591509
SURFACE ELEVATION	404
AZIMUTH	0
DIP	-90

HOLE NO:	**MPV-04-160c**
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	04-Mar 2004 1230hrs
FINISH DATE AND TIME	05-Mar-2004 2200hrs
HOLE DIAMETER	47.6 (NQ)
DRILLING METHOD	Diamond core

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
DS 0700-1900	M Story	4-Mar-04		7	7	0	Move rig from previous location.	0	0	0.00	0	0	0	0.00
NS 1900-0700	B Rameseder	4-Mar-04		12	2.25	17.90	advance drilling slowly in order to get sediments, pressure gauge was broken on packer set-up	17.9	9.75	1.84	12	2.25	9.75	1.84
DS 0700-1900	M Story	5-Mar-04		12	4	29.90	5 times packer testing.	12	8	1.50	24	6.25	17.75	1.68
NS 1900-0700	B Rameseder	5-Mar-04		3	3	29.90	reflex, cement hole, pull down for move	0	0	0.00	27	9.25	17.75	1.68

OVERALL HOLE DRILL RATE (m/hr)	0.88
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	1.68

GENERAL GEOTECH LOG

DRILLHOLE ID: **MPV-04-160c**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
3.80	8.45	4.65	OVB	1.55	33.3					OVB: overburden consisting of several boulders (granite, gneiss, pegmatite) up to 30 cm long
8.45	10.45	2.00	AGRN	1.85	92.5	1.45	72.5	1.45	72.5	AGRN: altered granite: broken up grinded pieces due to alteration of feldspars in granite to clay, large quartz filled fractures parallel to core axis and drilling
10.45	11.90	1.45	AGRN	1.45	100.0	1.41	97.2	1.33	91.7	
11.90	12.56	0.66	AGRN	0.66	100.0	0.66	100.0	0.66	100.0	
12.56	13.51	0.95	AGRN	0.95	100.0	0.43	45.3	0.35	36.8	AGRN: altered granite: broken up grinded pieces due to alteration of feldspars in granite to clay, large quartz filled fractures parallel to core axis and drilling
13.51	14.90	1.39	AGRN	1.65	118.7	1.47	105.8	1.40	100.7	broken at end of run
14.90	17.90	3.00	AGRN	2.96	98.7	2.90	96.7	2.34	78.0	granite still altered but less than above
17.90	20.43	2.53	AGRN	2.53	100.0	2.45	96.8	2.35	92.9	
20.43	20.90	0.47	AGRN							Rock fragments.
20.90	23.90	3.00	AGRN	2.90	96.7	2.90	96.7	2.90	96.7	
23.90	26.65	2.75	AGRN	2.75	100.0					
26.65	26.90	0.25	AGRN							Rock fragments.
26.90	29.90	3.00	GRN	3.06	102.0	3.01	100.3	2.94	98.0	GRN: granite
EOH										

DETAILED GEOTECHNICAL LOG DRILLHOLE ID: **MPV-04-160c**

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

FROM (m)	TO (m)	ROCK TYPE	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of Sets	Type	Totals	JOINT CONDITIONS				COMMENT
			STRONG R	WEAK R	% WEAK	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH				ANGLE	ROUGH	ALT	FILL	
3.8	8.5	**OVB**				0	0	0	0	0	0	0								
8.5	10.5	**AGRN**	R2			0	0	0	0	0	0	0								**AGRN: altered granite: broken up grinded pieces due to alteration of feldspars in granite to clay, large quartz filled fractures parallel to core axis and drilling; clay seam at 9.65-9.7m**
10.5	11.9	**AGRN**	R2			18	0	5	4	2	1	1	3	J1	3	35	5	0	3	
														J2	1	35	5	0	3	**0.5cm quartz fill in cemented joints; fill is harder than granite; medium sized fill; broken cemented joints stepped to smoothly stepped; sometimes alteration (weaker than wallrock)**
														J3	1	15	7	0	3	
11.9	12.6	**AGRN**	R2			6	0	1	3	1	1	1	1	J1	1	20	2	0	3	
12.6	13.5	**AGRN**	R2			0	0	0	0	0	0	0								**AGRN: altered granite: broken up grinded pieces due to alteration of feldspars in granite to clay, large quartz filled fractures parallel to core axis and drilling**
13.5	14.9	**AGRN**	R3			14	0	5	3	1	1	1	3	J1	1	55	7	0	3	
														J2	3	40	7	2	3	
														J3	1	40	4	0	3	
14.9	17.9	**AGRN**	R4			30	0	13	2	1	1	1	3	J1	1	20	7	0	3	
														J2	8	70	7	0	3	**joint set 3: quartz filling, on top of filling rock is weathered to coarse grains and some clay;** joint set 4 anle 60, rough 7, alt 0, fill 3, joint set 5 2 joints, angle 85, rough 7, alt 0, fill3
														J3	1	40	5	1	2	
17.9	20.4	**AGRN**	R4			11	0	6	0		1	1	3	J1	2	65	5	1	9	
														J2	3	35	4	0	3	
														J3	1	45	2	0	2	J2 set: angles 25,30, 35.
20.9	23.9	**AGRN**	R5			19	0	7	0		1	1	3	J1	1	75	8	0	9	
														J2	1	65	7	0	9	
														J3	2	40	4	0	3	(2)J4 -50 deg, roughness -5, alt - 0, fill-3.(1) J5 -75, roughness - 2, alt
23.9	26.7	**AGRN**	R4			18	0	5	2	0	1	0	3	J1	2	60	5	0	3	
														J2	1	45	2	0	3	
														J3	2	80	2	0	2	
26.7	26.9	**AGRN**	R4																	
26.9	29.9	**GRN**	R4			22	0	6	2	1	1	1	3	J1	1	65	7	0	3	
														J2	2	75	7	0	3	
														J3	1	10	7	0	3	joint set 4: 2 joints, angle 45, rough 5, alt 0, fill 9
EOH																				

FIELD GEOLOGICAL LOG **MPV-04-160c**

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	3.80	Ice/water		to 1.6m ice, 2.2m water	BR
3.8	8.45	OVB		OVB: overburden consisting of several cobbles and boulders (granite, gneiss, pegmatite) up to 30 cm long	BR
8.45	29.90	Altered Granite		Altered Granite: greenish -grey colour with pinkish specks; rock has waxy appereance, plagioclase seems to alter to caolinite (clay), K-feldspars still visible as pink megacrysts, clay seam at 9.65-9.7m depth; rock contains many quartz veins (up to 0.5cm thickness of fill); green=chlorite?, traces of sulphides observed at 11.6-11.9m; at 11.9-12.2 large quartz veins (up to 2cm thick) starting at 13.5m granite starts to become more compact, feldspar and mafic minerals seem fresher, more pink in colour; hematite stained, higher mafic mineral content (more mica), sometimes vuggy appearance	BR
EOH					

Photo Record

MPV-04-160c

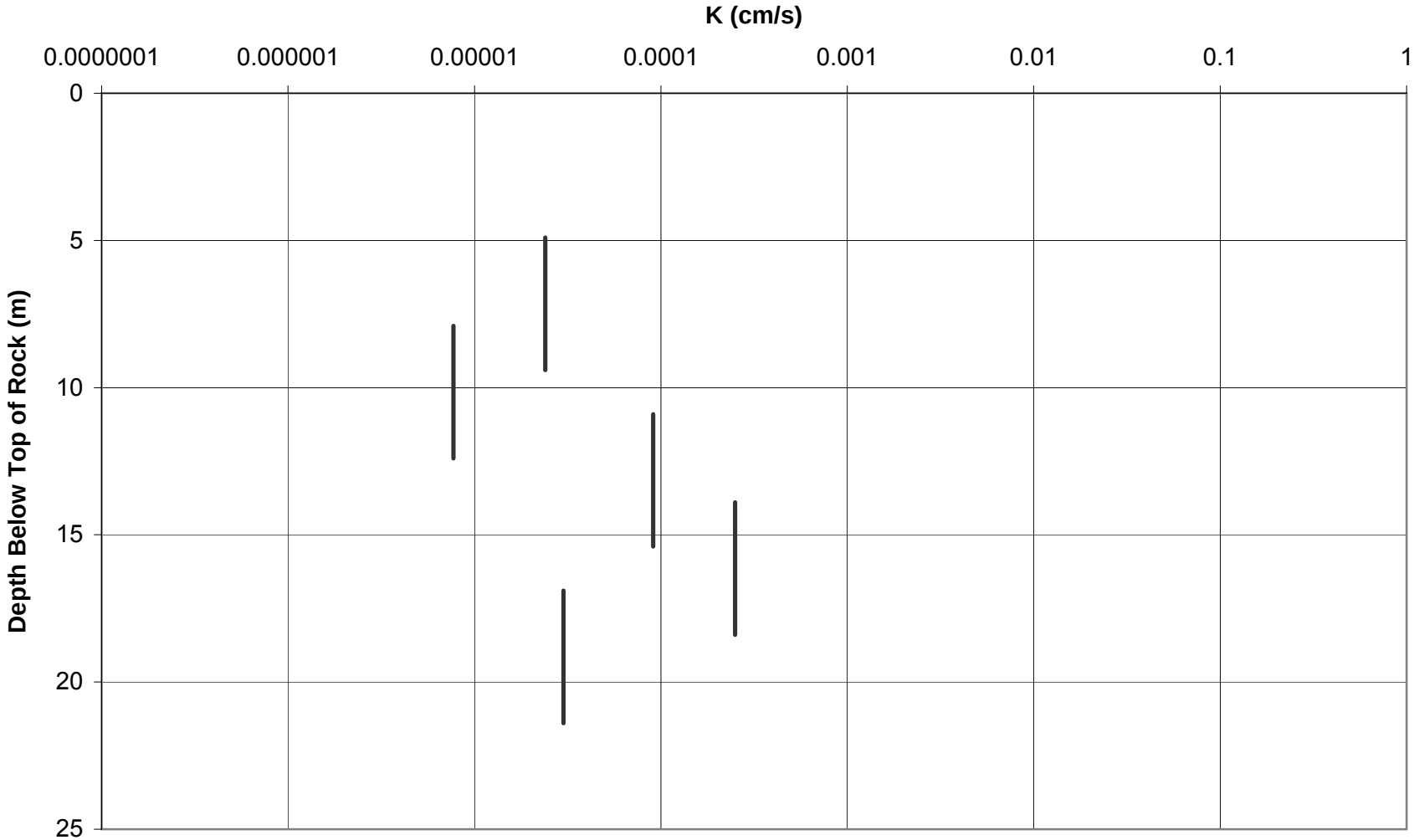
Date	Shift	Filename	Depth	Description
04/03/2004	NS 1900-0700	MPV-04-160C-3.8mbox1	3.8-10.85m	overburden, altered granite
04/03/2004	NS 1900-0700	MPV-04-160C-10.85mbox2	10.85-14.9m	altered granite
05/03/2004	DS 0700-1900	MPV-04-160C-14.9mbox3	14.9 - 19.27m	
05/03/2004	DS 0700-1900	MPV-04-160C-19.27mbox4	19.27 - 23.62	
05/03/2004	NS 1900-0700	MPV-04-160C-23.62mbox5	23.62-27.8m	
05/03/2004	NS 1900-0700	MPV-04-160C-27.8mbox6	27.8-29.9m	EOH

Core Box Record

MPV-04-160c

Box	From	To	Comments
1	3.80	10.85	OVB, altered granite
2	10.85	14.90	altered granite
3	14.90	19.27	
4	19.27	23.62	
5	23.62	27.80	
6	27.80	29.90	EOH

Permeability vs Depth
MPV_04_160C



Packer Test Data

Date	3/4/2004, 3/5/2004
Staff	M Story, B. Rameseder
Init. WL:	0
Ref. Pt.	drill shack floor
Dip	90

MPV-04-160c

Test 1 13.4 17.9

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments
1	0	5319.60			no leaks
	1	5319.65	0.05	4.0	
	2	5319.70	0.05		
	3	5319.75	0.05		
	4	5319.80	0.05		
2	0	5320.40		7.0	no leaks
	1	5320.45	0.05		
	2	5320.50	0.05		
	3	5320.55	0.05		
	4	5320.60	0.05		
3	0	5321.30		10.5	no leaks
	1	5321.75	0.45		
	2	5322.00	0.25		
	3	5322.20	0.20		
	4	5322.45	0.25		
4	0	5322.45		7.5	no leaks
	1	5322.50	0.05		
	2	5322.65	0.15		
	3	5322.80	0.15		
	4	5322.95	0.15		
	5	5323.10	0.15		
5	0	5323.10		4.0	no leaks
	1	5323.10	0.00		
	2	5323.10	0.00		
	3	5323.12	0.02		
	4	5323.14	0.02		
	5	5323.16	0.02		

Summary 13.4 17.9

Flow rate (gpm)	Pressure (psi)
0.50	4.0
0.50	7.0
2.33	10.5
0.15	7.5
0.02	4.0

Test 2 16.4 20.9

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments
1	0	5323.80			no leaks
	1	5323.80	0.00	5.0	
	2	5323.80	0.00		
	3	5323.80	0.00		
	4	5323.80	0.00		
	5	5323.80	0.00		
2	0	5324.30			no leaks
	1	5324.40	0.10	10.0	
	2	5324.50	0.10		
	3	5324.60	0.10		
	4	5324.70	0.10		
	5	5324.80	0.10		
3	0	5325.40		15.0	no leaks
	1	5325.50	0.10		
	2	5325.70	0.20		
	3	5325.80	0.10		
	4	5325.85	0.05		
	5	5325.95	0.10		
	6	5326.05	0.10		
	7	5326.15	0.10		
4	0	5326.20		10.0	no leaks
	1	5326.30	0.10		
	2	5326.35	0.05		
	3	5326.40	0.05		
	4	5326.45	0.05		
5	0	5326.45		5.0	no leaks
	1	5326.45	0.00		
	2	5326.45	0.00		
	3	5326.45	0.00		
	4	5326.45	0.00		

Summary 16.4 20.9

Flow rate (gpm)	Pressure (psi)
0.0	5.0
0.1	10.0
0.1	15.0
0.05	10.0
0.0	5.0

Test 3 19.4 23.9

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments
1	0	5334.20			no leaks
	1	5335.00	0.80	7.0	
	2	5335.30	0.30		
	3	5335.60	0.30		
	4	5336.00	0.40		
	5	5336.30	0.30		
	6	5336.60	0.30		
2	0	5338.00		14.0	no leaks
	1	5338.70	0.70		
	2	5339.30	0.60		
	3	5340.00	0.70		
	4	5340.70	0.70		
	5	5341.40	0.70		
3	0	5343.50		20.0	no leaks
	1	5344.50	1.00		
	2	5345.40	0.90		
	3	5346.30	0.90		
	4	5347.30	1.00		
	5	5348.3	1.00		

Summary 19.4 23.9

Flow rate (gpm)	Pressure (psi)
0.33	7.0
0.70	14.0
0.97	20.0
0.83	14.0
0.36	7.0

4	0	5349.00		14.0	no leaks
	1	5349.60	0.60		
	2	5350.40	0.80		
	3	5351.20	0.80		
	4	5351.90	0.70		
	5	5352.80	0.90		
	6	5353.60	0.80		
	7	5354.40	0.80		
5	0	5354.50		7.0	no leaks
	1	5354.80	0.30		
	2	5355.10	0.30		
	3	5355.40	0.30		
	4	5355.80	0.40		
	5	5356.20	0.40		

Test 4 22.4 26.9

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments
1	0	5371.00		8.0	no leaks
	1	5372.10	1.10		
	2	5373.30	1.20		
	3	5374.40	1.10		
	4	5375.00	0.60		
	5	5376.50	1.50		
	6	5377.60	1.10		
	7	5378.70	1.10		
	8	5379.80	1.10		
2	0	5382.00		16.0	no leaks
	1	5384.60	2.60		
	2	5386.90	2.30		
	3	5389.30	2.40		
	4	5391.60	2.30		
	5	5394.10	2.50		
3	0	5403.50		25.0	no leaks
	1	5406.50	3.00		
	2	5409.60	3.10		
	3	5412.80	3.20		
	4	5415.90	3.10		
	5	5418.9	3.00		
4	0	5421.00		15.0	no leaks
	1	5423.20	2.20		
	2	5425.40	2.20		
	3	5427.20	1.80		
	4	5429.20	2.00		
	5	5431.20	2.00		
	6	5433.20	2.00		
5	0	5435.00		8.0	no leaks
	1	5436.00	1.00		
	2	5437.40	1.40		
	3	5438.70	1.30		
	4	5439.90	1.20		
	5	5441.10	1.20		

Summary 22.4 26.9

Flow rate (gpm)	Pressure (psi)
1.10	8.0
2.40	16.0
3.10	25.0
2.00	15.0
1.23	8.0

Test 5 25.4 29.9

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments
1	0	5460.20		10.0	no leaks
	1	5460.40	0.20		
	2	5460.55	0.15		
	3	5460.70	0.15		
	4	5460.85	0.15		
	5	5461.00	0.15		
	6	5461.15	0.15		
2	0	5461.50		20.0	no leaks
	1	5461.80	0.30		
	2	5462.10	0.30		
	3	5462.60	0.50		
	4	5462.95	0.35		
	5	5463.30	0.35		
	6	5463.70	0.40		
	7	5464.05	0.35		
3	0	5464.70		30.0	no leaks
	1	5465.10	0.40		
	2	5465.60	0.50		
	3	5466.10	0.50		
	4	5466.55	0.45		
	5	5467.05	0.50		
4	0	5467.90		20.0	no leaks
	1	5468.30	0.40		
	2	5468.60	0.30		
	3	5468.95	0.35		
	4	5469.30	0.35		
	5	5469.60	0.30		
5	0	5469.80		10.0	no leaks
	1	5470.00	0.20		
	2	5470.20	0.20		
	3	5470.25	0.05		
	4	5470.45	0.20		
	5	5470.65	0.20		
	6	5470.85	0.20		

Summary 25.4 29.9

Flow rate (gpm)	Pressure (psi)
0.15	10.0
0.37	20.0
0.48	30.0
0.33	20.0
0.20	10.0

Permeability Summary

MPV-04-160c

from	to		Step 1	Step 2	Step 3	Step 4	Step 5	Avg K
13.4	17.9	gauge (psi)	4	7	10.5	7.5	4	
		Qavg (igpm)	0.05	0.05	0.233	0.15	0.02	
		K cm/sec	**2.2E-05**	**1.3E-05**	**3.9E-05**	**3.5E-05**	**8.8E-06**	2.4E-05
16.4	20.9	gauge (psi)	5	10	15	10	5	
		Qavg (igpm)	0	0.1	0.1	0.05	0	
		K cm/sec	**0.0E+00**	**1.8E-05**	**1.2E-05**	**8.8E-06**	**0.0E+00**	7.7E-06
19.4	23.9	gauge (psi)	7	14	20	14	7	
		Qavg (igpm)	0.33	0.7	0.97	0.83	0.36	
		K cm/sec	**8.3E-05**	**8.8E-05**	**8.6E-05**	**1.0E-04**	**9.1E-05**	9.1E-05
22.4	26.9	gauge (psi)	8	16	25	15	8	
		Qavg (igpm)	1.1	2.4	3.1	2	1.23	
		K cm/sec	**2.4E-04**	**2.6E-04**	**2.2E-04**	**2.4E-04**	**2.7E-04**	2.5E-04
25.4	29.9	gauge (psi)	10	20	30	20	10	
		Qavg (igpm)	0.15	0.37	0.48	0.33	0.2	
		K cm/sec	**2.65E-05**	**3.27E-05**	**2.82E-05**	**2.91E-05**	**3.53E-05**	3.0E-05

Equations: *$Hf = 8.65x10^{-15} (Q^2 * Lp/rp^5)$*

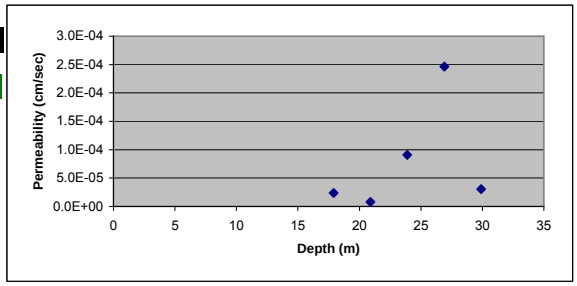
H_{nit} = (Dw'+Hg-Hf)+Pg/1.42

K = $(Q*Ln(R/r_b))/2*\pi*H_{nit}*L)$

Overall **8.0E-05**

assume
- vertical drillhole
- water at ground surface
- height of gauge is at rig flr
- negligible friction losses

Dw	Measured depth of static water (1)	*0*	m
Dp	Measured depth to packer		m
Dt	Depth to midpoint of test		m
Inc	Inclination from horizontal	*90*	m
Dw'	Vertical depth to static water level		°
Dp'	Vertical depth to packer		m
Dt'	Vertical depth to midpoint of test		m
Hg	Gauge height	*0*	m
Lp	Length of discharge pipe		m
rp	Radius of discharge pipe (1" = 0.0127m)		m
R	Radius of influence (10m is standard)	10	m
rb	Drillhole radius (HQ=0.048m, NQ=0.038m)	0.038	m
L	Length of test section		m
Hf		0	m



Reflex Readings **MPV-04-160C**

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Field	Temp ©
05-Mar-04	29.9	276.3	89.3	227.7	6020	6.8

UCS SAMPLES

HOLE ID: MPV-04-160C

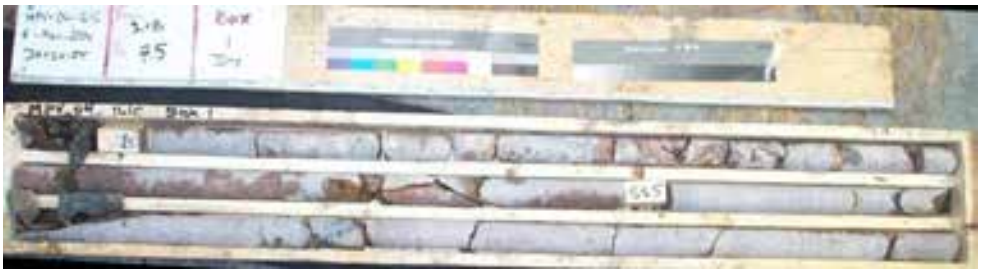
HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-160C	6	27.52-27.82	Granite	04-UCS-160-001

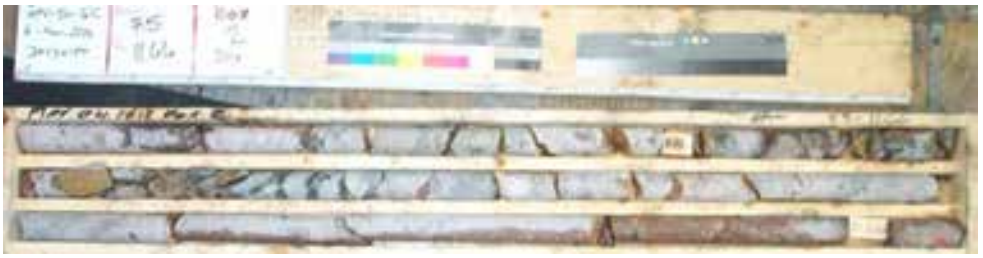
POINT LOAD TEST - INPUT

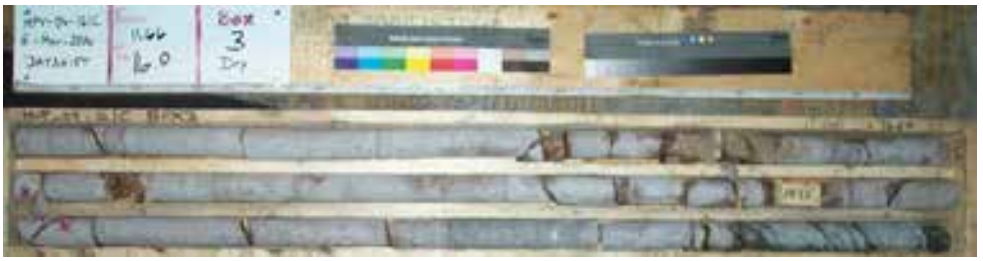
DRILL HOLE ID: MPV-04-160C

No. #	Tested by	DATE	HOLE/ FACE ID	DIST. (m)	ROCK TYPE	TEST TYPE	ORINT	DAYS	W (mm)	D (mm)	P (kN)	COMMENT
1	John Delgaty	##########	MPV-04-160C	27.82	granite	1				47.40	16.90	Medium grained pink granite - a good clean break
2	John Delgaty	##########	MPV-04-160C		granite	1				47.40	23.20	Medium grained pink granite - a good clean break
3	John Delgaty	##########	MPV-04-160C	to	granite	1				47.40	14.37	Medium grained pink granite - a good clean break
1	John Delgaty	##########	MPV-04-160C		granite	1				47.40	16.33	Medium grained pink granite - a good clean break
2	John Delgaty	##########	MPV-04-160C		granite	1				47.40	12.63	Medium grained pink granite - a good clean break
3	John Delgaty	##########	MPV-04-160C	29.56	granite	1				47.40	16.95	Medium grained pink granite - a good clean break

MPV_04_161C







MPV_04_161C

Diary

MPV-04-161c

NS 5/03/2004

	start packing and moving from MPV-04-
2200hrs	160c to this hole
0700hrs	move completed,ready for casing

DS 6/03/2004

	Start casing. New drillers on site. BL gave
0700hrs	new drillers orientation.
	Casing at 5.55m below floor level. Bedrock
	at 3.25 m . 0.55m to snow/ice. 1.15m to
1200hrs	ground level.
1600hrs	at 14.6m
1900hrs	at 23.55m

NS 6/03/2004

	New helper; change bit
2100hrs	start drilling
2230hrs	26.55m
2330hrs	29.55m
0100hrs	31.55m
0200hrs	reflex completed
0400hrs	thermistor installed, rods pulled

SRK Consulting
Engineers and Scientists

FIELD DRILL PERFORMANCE LOG

PROJECT	**Gahcho Kue Geotech**
PROJECT NO	**2CD002.11**
NORTHING	7035467
EASTING	591477
SURFACE ELEVATION	406.2
AZIMUTH	147
DIP	-70

HOLE NO:	**MPV-04-161c**
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	5-Mar 2004 2200hrs
FINISH DATE AND TIME	7-Mar 2004 0400hrs
HOLE DIAMETER	47.6 (NQ)
DRILLING METHOD	Diamond core

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
NS 1900-0700	B Rameseder	03/05/2004		9	9	0	move and set-up	0	0	0.00	0	0	0	0.00
DS 0700-1900	M Story	03/06/2004		12	0	23.55		23.55	12	1.96	12	0	12	1.96
NS 1900-0700	B Rameseder	03/06/2004		9	5	31.55	change bit, reflex, put thermistor in hole	8	4	2.00	21	5	16	1.97

OVERALL HOLE DRILL RATE (m/hr)	1.05
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	1.97

GENERAL GEOTECH LOG

DRILLHOLE ID: **MPV-04-161c**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
1.13	3.25	2.12	OVBN							Overburden. Reference: drill floor level.
3.25	5.55	2.30	GRN	2.29	99.6	2.26	98.3	2.26	98.3	
5.55	8.55	3.00	GRN	2.95	98.3	2.95	98.3	2.88	96.0	
8.55	9.25	0.70	GRN							Fractured rock.
9.25	11.55	2.30	GRN	2.15	93.5	2.15	93.5	2.15	93.5	Some biotite between 8.6 and 9.4m .
11.55	14.55	3.00	GRN	2.77	92.3	2.70	90.0	2.60	86.7	
14.55	17.55	3.00	GRN	3.05	101.7	3.05	101.7	3.05	101.7	Some biotite between 15.5 and 16.6m.
17.55	20.55	3.00	GRN	2.75	91.7	2.75	91.7	2.75	91.7	Some biotite between 17.6 and 19.0m.
20.55	23.55	3.00	GRN	3.40	113.3	3.40	113.3	3.40	113.3	some rock of last run most have stayed in the ground when pulling the tub
23.55	26.55	3.00	GRN	2.98	99.3	2.98	99.3	2.98	99.3	
26.55	29.55	3.00	GRN	2.97	99.0	2.97	99.0	2.97	99.0	
29.55	31.55	2.00	GRN	1.95	97.5	1.95	97.5	1.95	97.5	
EOH										

DETAILED GEOTECHNICAL LOG

DRILLHOLE ID: **MPV-04-161c**

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

FROM	TO	ROCK	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of			JOINT CONDITIONS				COMMENT
(m)	(m)	TYPE	STRONG R	WEAK R	% WEAK	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH	Sets	Type	Totals	ANGLE	ROUGH	ALT	FILL	
3.25	5.55	**GRN**	R4			16	0	6	0		1	0	3	J1	2	65	2	0	9	
														J2	3	40	2	0	3	
														J3	1	70	5	0	3	Ji: angles 65, 80; heatite staining. J2:angles 35, 40. Heatite at J2.
5.60	8.60	**GRN**	R6			19	0	8	0		1	0	3	J1	3	45	5	0	3	
														J2	2	45	2	0	3	
														J3	3	80	4	0	3	J1 angles 65, 45.
9.25	11.55	**GRN**	R5			11	0	2	1	0	1	0	3	J1	1	45	5	0	9	
														J2	1	65	5	0	3	
														J3	1	75	2	0	3	Broken rock fragments.
11.55	14.55	**GRN**	R6			16	0	6	0		1	1	3	J1	3	80	5	0	9	
														J2	2	70	5	0	1	
														J3	2	60	5	0	3	J1 angles 80, 80, 70. J2 angles 70, 80. J4: 75 degrees; rough:2; alt:0; fill:3.
14.55	17.55	**GRN**	R5			26	0	3	1	0	1	0	3	J1	1	65	5	0	9	
														J2	1	65	4	0	9	
														J3	1	50	4	0	9	
17.55	20.55	**GRN**	R4			15	0	2	0	0	1	0	2	J1	2	65	5	0	3	
																				JI: angles 65, 70.
20.55	23.55	**GRN**	R5			23	0	4	2	0	1	0	2	J1	3	45	2	0	3	
														J2	1	10	5	0	3	
23.55	26.55	**GRN**	R5			9	0	0	0		1	0								
26.55	29.55	**GRN**	R5			11	0	2	1	1	1	0	2	J1	1	15	2	0	3	
														J2	1	30	5	0	3	
																				chlorite coating on joints
29.55	31.55	**GRN**	R5			8	0	1	0		1	0	1	J1	1	20	3	0	3	
EOH																				

FIELD GEOLOGICAL LOG

HOLE ID MPV-04-161c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0	1.13	Ice/snow		Ice/snow	MS
1.13	3.25	OVB		Overburden	MS
3.25	31.5	GRN		Granite: pinkish-grey, medium grained with some pegatitic sections, some quartz veins, hematite/chlorite staining observed at some joints, compact, fresh granite	MS
EOH					

Photo Record

MPV-04-161c

Date	Shift	Filename	Depth	Description
03/06/2004	DS 0700-1900	MPV-04-160C-3.18mbox1	3.18 - 7.5m	
03/06/2004	DS 0700-1900	MPV-04-160C-7.5mbox2	7.5 - 11.66m	
03/06/2004	DS 0700-1900	MPV-04-160C-11.66mbox3	11.66 - 16.00m	
03/06/2004	DS 0700-1900	MPV-04-160C-16.00mbox4	16.00 - 20.55m	
03/06/2004	NS 1900-0700	MPV-04-160C-20.55mbox5	20.55-24.49m	
03/06/2004	NS 1900-0700	MPV-04-160C-24.49mbox6	24.49-28.8m	
03/06/2004	NS 1900-0700	MPV-04-160C-28.8mbox7	28.8-31.55m	EOH

Core Box Record

MPV-04-161c

Box	From	To	Comments
1	3.18	7.50	
2	7.50	11.66	
3	11.66	16.00	
4	16.00	20.55	
5	20.55	24.49	
6	24.49	28.80	
7	28.80	31.55	EOH

Reflex Readings

MPV-04-161C

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Field	Temp ©
07-Mar-04	31.55	135.5	68.7	349.7	6008	7.9

Thermistor Readings

MPV-04-161c

Thermistor String ID **32/16-13**

Thermis Node	Reading (kOhms)	Comments
1	15.26	
2	15.18	
3	16.19	
4	14.39	
5	14.24	
6	15.38	
7	15.31	
8	15.16	
9	14.31	
10	15.19	
11	14.36	
12	15.43	
13	14.77	
14	14.83	
15	15.73	
16	16.04	

UCS SAMPLES

HOLE ID: MPV-04-161C

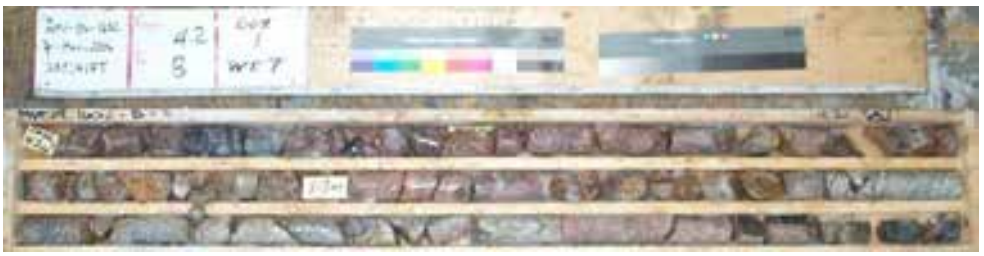
HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-161C	7	29.64-29.93	Granite	04-UCS-161-001

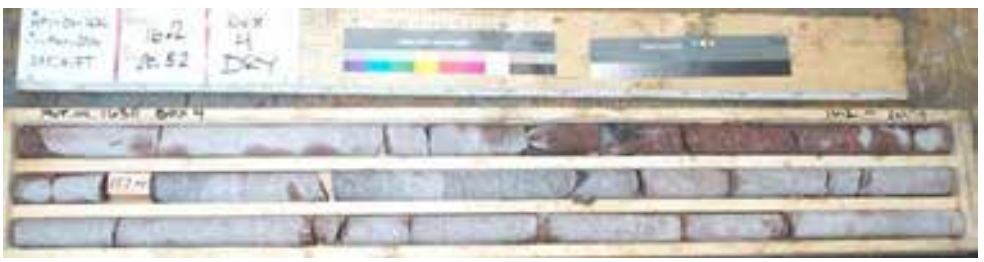
POINT LOAD TEST - INPUT

DRILL HOLE ID: MPV-04-161C

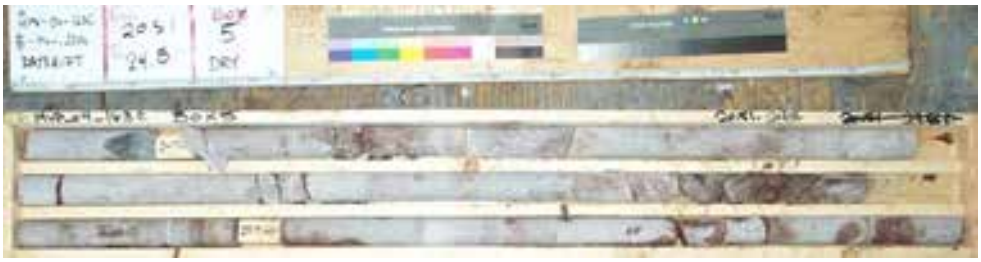
No. #	Tested by	DATE	HOLE/ FACE ID	DIST. (m)	ROCK TYPE	TEST TYPE	ORINT	DAYS	W (mm)	D (mm)	P (kN)	COMMENT
	BAM	04/07/2004	MPV-04-161C	29.30	GRANITE	1	RIGHT			47.16	1650.00	GOOD BREAK
	BAM	04/07/2004	MPV-04-161C	29.30	GRANITE	1	RIGHT			47.16	940.00	GOOD BREAK
	BAM	04/07/2004	MPV-04-161C	29.30	GRANITE	1	RIGHT			47.16	1475.00	GOOD BREAK
	BAM	04/07/2004	MPV-04-161C	30.00	GRANITE	1	LEFT			47.16	1960.00	GOOD BREAK
	BAM	04/07/2004	MPV-04-161C	30.00	GRANITE	1	LEFT			47.16	1750.00	GOOD BREAK
	BAM	04/07/2004	MPV-04-161C	30.00	GRANITE	1	LEFT			47.16	1620.00	FAIR BREAK
	BAM	04/07/2004	MPV-04-161C	30.00	GRANITE	1	LEFT			47.16	1650.00	GOOD BREAK

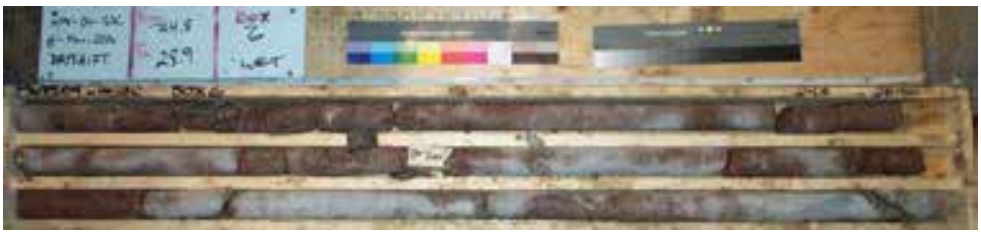
MPV_04_163C

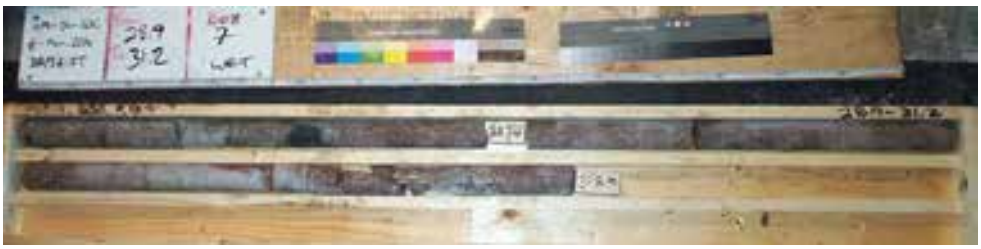


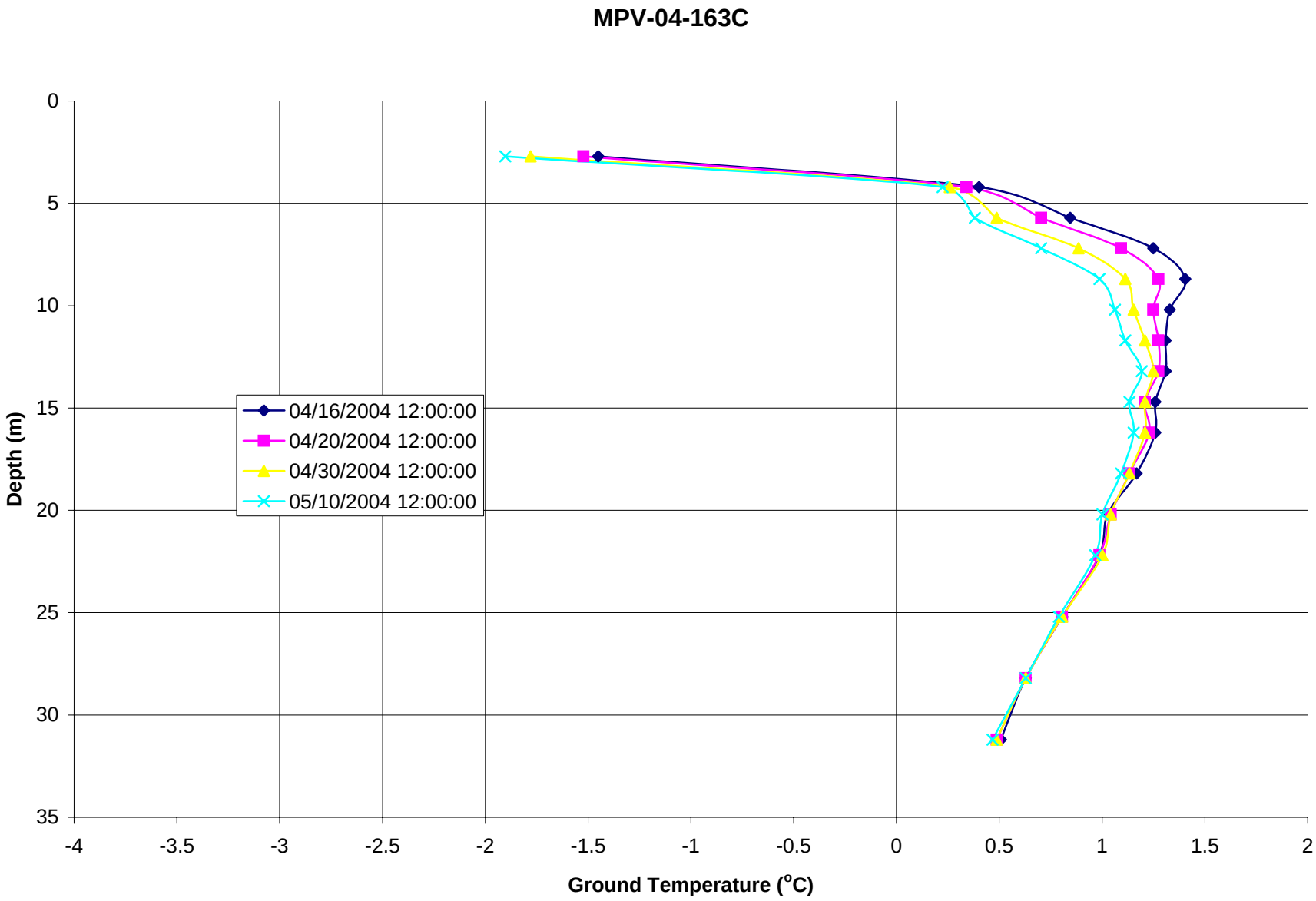


MPV_04_163C








MPV-04-163C
Depth (m)
0
5
10
15
20
25
30
35
-4
-3.5
-3
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Ground Temperature (°C)
04/16/2004 12:00:00
04/20/2004 12:00:00
04/30/2004 12:00:00
05/10/2004 12:00:00

Diary

MPV-04-163c

DS 07/03/2004

0700hrs	Rig at new location. Drillers need to install new oil stove, bury lines et.
1000hrs	Start casing
1230hrs	Casing at 4.2m below floor level. Bedrock at 4.2m below floor level. Ground level at 1.2m
1300hrs	Drill down to 5.2m. Loss of return at 5m.
1315hrs	Water intake pump stopped.
1350hrs	Water intake pump back online.
1415hrs	Drill rig shut down for repairs. Water kept circulating.
1515hrs	Rig back online.
1630hrs	Drill bit finished.
1645hrs	Whiteout conditions. Drillers stop work.

NS 07/03/2004

1700hrs	Night shift drillers showed up to maintain rig overnight during whiteout. No drilling allowed due to unsafe conditions caused by whiteout. NS Geologist stayed at camp due to unsafe conditions.

DS 08/03/2004

0700hrs	Drillers continue to drill.
1000hrs	down to 14.7m
1200hrs	Driller change sludge pump.
1400hrs	Generator offline.
1645hrs	Generator online.
1730hrs	EOH @ 31.2m
1800hrs	Take reflex.

NS 08/03/2004

2100hrs	thermistor installation completed; new driller; ground level surface was underestimated (more than 2 m thermistor sticking out off ground)
	started to pull down for move; white-out called

SRK Consulting
Engineers and Scientists

FIELD DRILL PERFORMANCE LOG

PROJECT	**Gahcho Kue Geotech**
PROJECT NO	**2CD002.11**
NORTHING	7035450
EASTING	591487
SURFACE ELEVATION	405.2
AZIMUTH	0
DIP	-70

HOLE NO:	**MPV-04-163c**
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	7/3/2004 0700hrs
FINISH DATE AND TIME	8/3/2004 2200hrs
HOLE DIAMETER	47.6 (NQ)
DRILLING METHOD	Diamond core

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
DS 0700-1900	M Storey	7-Mar-04		12	8	11.7	Set up rig, install new stove coil, shut down drill rig for repairs/maintenance, white out.	11.7	4	2.93	12	8	4	2.93
NS 1900-0700	B Rameseder	7-Mar-04		12	12	0.00	White out conditions. No drilling was conducted.		0		24	20	4	0.00
DS 0700-1900	M Storey	8-Mar-04		12	3	31.20	maintain generator, reflex	31.2	9	3.47	36	23	13	2.40
NS 1900-0700	B Rameseder	8-Mar-04		4	4	0.00	install thermistor, pull rods; white-out call		0		40	27	13	0.00

OVERALL HOLE DRILL RATE (m/hr)	1.07
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	3.30

GENERAL GEOTECH LOG

DRILLHOLE ID: **MPV-04-163c**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
0.00	4.20	4.20	OVBN							
4.20	5.70	1.50	GRN							Broken rock fragments. Only 2 pieces longer than 10 cm.
5.70	8.70	3.00	GRN	2.70	90.0	2.40	80.0	2.00	66.7	Many rock fragments from mechanical breaks. Rock fragments from 6.0 to 6.5m and from 8.3 to 8.7m.
8.70	11.70	3.00	GRN	3.05	101.7	2.90	96.7	2.90	96.7	Rock fragments (mechanical fracture) from 8.7 to 8.95m
11.70	14.70	3.00	GRN	2.90	96.7	2.90	96.7	2.63	87.7	
14.70	17.70	3.00	GRN	3.04	101.3	3.04	101.3	3.04	101.3	
17.70	20.70	3.00	GRN	3.01	100.3	3.01	100.3	3.01	100.3	
20.70	23.70	3.00	GRN	2.90	96.7	2.66	88.7	2.50	83.3	Rock fragments from 23.05 to 23.25m.
23.70	26.70	3.00	GRN	3.05	101.7	2.90	96.7	2.65	88.3	
26.70	29.70	3.00	GRN	3.02	100.7	3.02	100.7	2.94	98.0	
29.70	31.20	1.50	GRN	1.55	103.3	1.55	103.3	1.37	91.3	
EOH										

DETAILED GEOTECHNICAL LOG

DRILLHOLE ID: **MPV-04-163c**

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

FROM	TO	ROCK	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of			JOINT CONDITIONS				COMMENT
(m)	(m)	TYPE	STRONG R	WEAK R	% WEAK	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH	Sets	Type	Totals	ANGLE	ROUGH	ALT	FILL	
5.7	8.7	GRN	R5			30	0	13	0		1	0	2	J1	7	60	5	0	3	
														J2	6	45	4	0	3	
																				Ji angles range from 45 to 75. J2 angles range from 40 to 55.
8.7	11.7	GRN	R4			15	0	5	0		1	0	3	J1	1	75	7	0	1	
														J2	3	80	5	0	1	
														J3	1	90	4	0	1	J2 angles (2) 80, (1) 50.
11.7	14.7	GRN	R5			18	0	6	0		1	0	3	J1	2	30	5	0	3	
														J2	2	50	2	0	1	
														J3	1	60	4	0	3	J4: 75 deg.;rogh 5;alt 0; fill 1.
14.7	17.7	GRN	R5			14	0	1	0		1	0	1	J1	1	25	3	0	3	
																				Calcite coating on J1.
17.7	20.7	GRN	R6			15	0	1	0		0		1	J1	1	45	5	0	1	
20.7	23.7	GRN	R6			13	0	8	0		0		2	J1	7	75	5	0	1	
														J2	1	80	2	0	1	
																			1	Ji anlges from (1) 65, (4)75, (1)65, (1)80.
23.7	26.7	GRN	R4			13	0	9	0		0		3	J1	6	60	4	0	3	
														J2	3	65	5	0	3	
																				J2 angles: 60,65, 70.
26.7	29.7	GRN	R6			9	0	3	0		1	0	2	J1	2	70	5	0	1	
														J2	1	35	5	0	1	
29.7	31.2	GRN	R5			7	0	0	0		1	0								
EOH																				

Photo Record

MPV-04-163c

Date	Shift	Filename	Depth	Description
7-Mar-04	DS 0700-1900	MPV-04-163C-4.2mbox1	4.2 - 8.1m	wet
7-Mar-04	DS 0700-1900	MPV-04-163C-8.1mbox2	8.1 - 11.7m	
8-Mar-04	DS 0700-1900	MPV-04-163C-11.7mbox3	11.7 - 14.7m	
8-Mar-04	DS 0700-1900	MPV-04-163C-20.51mbox4	16.2 - 20.51	
8-Mar-04	DS 0700-1900	MPV-04-160C-20.55mbox5	20.51 - 24.8m	
8-Mar-04	DS 0700-1900	MPV-04-163C-24.8mbox6	24.8 - 28.9m	
8-Mar-04	DS 0700-1900	MPV-04-163C-28.9mbox7	28.9 - 31.2m	EOH

Core Box Record

MPV-04-163c

Box	From	To	Comments
1	4.20	8.10	
2	8.10	11.70	
3	11.70	16.20	
4	16.20	20.52	
5	20.52	24.80	
6	24.80	28.90	
7	28.90	31.20	EOH
12			

Reflex Readings

MPV-04-163C

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N	Magnetic Fielc	Temp ©
08-Mar-04	31.2	123.9	68.5	247.3	6098	7.9

Thermistor Readings

MPV-04-163c

Thermistor String ID **32/16-15**

Thermis Node	Reading (kOhms)	Comments
1	14.09	
2	16.03	
3	16.15	
4	15.29	
5	13.89	
6	14.90	
7	15.71	
8	16.11	
9	15.30	
10	13.91	
11	15.75	
12	14.27	
13	15.40	
14	15.40	
15	15.65	
16	14.17	

FIELD GEOLOGICAL LOG

HOLE ID MPV-04-163c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0	1.8*	Snow/ice		Snow/ice (*corrected)	
1.8*	4.20	OVBN		OVBN	
4.2	31.2 (EOH)	GRN		Granite: pinkish-grey, medium grained, some pegmatitic sections.	MS

UCS SAMPLES

HOLE ID: MPV-04-163C

HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-163C	7	29.39-29.70	Granite	04-UCS-163-001

POINT LOAD TEST - INPUT

DRILL HOLE ID: MPV-04-163C

No. #	Tested by	DATE	HOLE/ FACE ID	DIST. (m)	ROCK TYPE	TEST TYPE	ORINT	DAYS	W (mm)	D (mm)	P (PSI)	COMMENT
	BAM	04/07/2004	MPV-04-163C	29.20	GRANITE	1	LEFT			47.00	1850.00	FAIR TO GOOD TEST
	BAM	04/07/2004	MPV-04-163C	29.20	GRANITE	1	LEFT			47.00	1450.00	GOOD BREAK
	BAM	04/07/2004	MPV-04-163C	29.20	GRANITE	1	LEFT			47.00	1720.00	GOOD BREAK
	BAM	04/07/2004	MPV-04-163C	29.80	GRANITE	1	RIGHT			47.00	1750.00	GOOD BREAK
	BAM	04/07/2004	MPV-04-163C	29.80	GRANITE	1	RIGHT			47.00	1470.00	GOOD BREAK
	BAM	04/07/2004	MPV-04-163C	29.80	GRANITE	1	RIGHT			47.00	1450.00	GOOD BREAK
	BAM	04/08/2004	MPV-04-163C	26.20	GRANITE	1	LEFT			46.80	1250.00	GOOD TEST
	BAM	04/08/2004	MPV-04-163C	26.20	GRANITE	1	LEFT			46.80	1100.00	GOOD TEST
	BAM	04/08/2004	MPV-04-163C	26.20	GRANITE	1	LEFT			46.80	1400.00	GOOD TEST
	BAM	04/08/2004	MPV-04-163C	27.00	GRANITE	1	RIGHT			46.80	1550.00	GOOD TEST
	BAM	04/08/2004	MPV-04-163C	27.00	GRANITE	1	RIGHT			46.80	1350.00	GOOD TEST
	BAM	04/08/2004	MPV-04-163C	27.00	GRANITE	1	RIGHT			46.80	1620.00	GOOD TEST

Diary

MPV-04-166c

NS 08/03/2004

start draining hoses and pulling down rig; white out called at about 22.00 hrs; Peter Dixon and drill crew at drill; crew was brought into camp in the morning by loader

DS 09/03/2004

white-out conditions in the morning; drill was moved to MPV-04-166c in the afternoon

NS 09/03/2004

finished set-up, tried to get everything started; new type of rig for driller therefore Peter Dixon helps with set-up; change drill to SQ (from NQ)

0400hrs start drilling into ice

0430hrs drilled through ice with ice cutter (about 1.8m); about 0.6m water

were not able to get through the ice with casing, have to ream the ice.

DS 10/03/2004

0700hrs Ice surface at 0.6m below floor level. Casing appears to be either broken or threads at fittings are destroyed. Peter Dixon left drill to find a tap to bring up

0800hrs casing.

Geobore sample taken (run 5.6-7.1m below floor level). 14" recovered from 60" plastic

1400hrs casing - 23 % recovery).

Gepbore sample from 7.1 to 8.0m Sand between plastic tube and inner tube

1630hrs recovered. 0% recovery.

Telephone discussion with Todd Martin (AMEC). TM:Abandon Geobore for all lake dyke holes. Continue D1-GB-1 with NQ drill.

1700hrs Cased to 8.6m

NS 10/03/2004

Foreman is drilling with driller (helper had to go to Yellowknife to get hisr finger straightened); had to ream through ice and add some more casing to 9.6m depth; Hook-up hydrauliques for sedimentation shack

2200hrs

2400hrs 18m depth; install packer

0230hrs	packer test completed and start to add rods
0300hrs	continue drilling
0400hrs	drilled to 21m
	hole in little nitrogen hose found and repaired
0620hrs	start 2nd packer test
0645hrs	packer test completed

DS 11/03/2004

1000hrs	packer testing at 24m
1115hrs	packer testing at 24m completed
1230hrs	set up for packer testing at 27m
1245hrs	Driller's helper quit job and walked of site.
1315hrs	packer testing at 27m completed
1330hrs	Driller repairs/maintains pumps.
1510hrs	Drilling resumes.
1615hrs	Set up packer test at 30m.
1720hrs	Packer test completed. Malfunction of intake pump caused fluctuation of pressure at last set of packer testing. Driller to commence repairs of pump.

NS 11/03/2004

2030hrs	fan belt and alternator was changed
2240hrs	36m drilled
0015hrs	42m drilled
0200hrs	6th packer test completed, adding rods
0400hrs	48m drilled
0500hrs	52m drilled
0545hrs	start packer 7
0640hrs	packer completed; rods back in hole

DS 12/03/2004

1000hrs	57m drilled.
1200hrs	EOH at 60m. Take packer test, reflex
1300hrs	Packer, reflex completed. Driller maintaining tanks.

Checklist - delete before finalizing and printing file

grouted?
staked?
summary updated?
point load test samples selected?

SRK Consulting
Engineers and Scientists

FIELD DRILL PERFORMANCE LOG

PROJECT	**Gahcho Kue Geotech**
PROJECT NO	**2CD002.11**
NORTHING	7034933
EASTING	589920
SURFACE ELEVATION	404
AZIMUTH	0
DIP	-90

HOLE NO:	**MPV-04-166c**
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	8-Mar-04 2200hrs
FINISH DATE AND TIME	12-Mar-04 1300hrs
HOLE DIAMETER	101.6 (Geobor S)/47.6 (NQ)
DRILLING METHOD	Diamond core

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
NS 1900-0700	B Rameseder	08/03/2004		9	9	0	pack up at last hole, white out till morning	0	0	0.00	0	0	0	0.00
DS 0700-1900	M Storey	09/03/2004		12	12	0.00	white out in the morning; move drill to new site		0	#DIV/0!	12	12	0	#DIV/0!
NS 1900-0700	B Rameseder	09/03/2004		12	12	0.00	get drill ready to go with Geobor S (everything was shut off since last night)		0	#DIV/0!	24	24	0	#DIV/0!
DS 0700-1900	M Storey	10/03/2004		12	6	8.60	Numerous problems with Geobore drilling.	8.6	6	1.43	36	30	6	1.43
NS 1900-0700	B Rameseder	10/03/2004		12	9	21.00	Hook-up hydrauliques for sedimantation shack, 2 packer tests, hole in nitrogene hose	12.4	3	4.13	48	39	9	2.33
DS 0700-1900	M Storey	11/03/2004		12	6.5	30.00	3 packer tests, problems with pump sucking sediments	9	5.5	1.64	60	45.5	14.5	2.07
NS 1900-0700	B Rameseder	11/03/2004		12	4.75	52.00	change fan belt and alternator	22	7.25	3.03	72	50.25	21.75	2.39
DS 0700-1900	M Storey	12/03/2004		6	1	60.00	Packer testing reflex.	8	5	1.60	78	51.25	26.75	2.24

OVERALL HOLE DRILL RATE (m/hr)	0.69
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	2.24

GENERAL GEOTECH LOG DRILLHOLE ID: **MPV-04-166c**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
4.10	9.30	5.20	OVBN							should be from 2.4-8.6 (32cm sediments recovered as well as some additional sand)
9.30	12.00	2.70	GRN	2.30	85.2	1.46	54.1	0.48	17.8	rock broken up core, many fractures and mechanical damage
12.00	15.00	3.00	GRN	2.80	93.3	0.63	21.0	0.24	8.0	rock broken up core, many fractures and mechanical damage
15.00	18.00	3.00	GRN	3.00	100.0	2.70	90.0	2.30	76.7	
18.00	21.00	3.00	GRN	3.00	100.0	2.92	97.3	2.17	72.3	
21.00	24.00	3.00	GGRN	3.05	101.7	2.94	98.0	2.82	94.0	Rock broken up core, many fractures due to mechanical damage
24.00	27.00	3.00	GGRN	2.90	96.7	2.20	73.3	2.05	68.3	Broken core in due 24.2 to 24.6m.
27.00	30.00	3.00	GRN	3.50	116.7	2.20	73.3	1.20	40.0	Highly fractured rock. Two 1.5 m runs (first partial run jammed with rock fragments.).
30.00	33.00	3.00	GRN	3.08	102.7	2.94	98.0	2.72	90.7	
33.00	36.00	3.00	GRN	2.98	99.3	2.78	92.7	2.36	78.7	
36.00	39.00	3.00	GRN	3.05	101.7	3.00	100.0	2.84	94.7	
39.00	40.53	1.53	GRN	1.53	100.0	1.45	94.8	1.13	73.9	
40.52	45.00	4.48	GGRN	4.46	99.6	4.47	99.8	4.47	99.8	GGRN: granitic Gneiss
45.00	48.00	3.00	GGRN	2.93	97.7	2.90	96.7	2.90	96.7	
48.00	51.00	3.00	GGRN	2.95	98.3	2.92	97.3	2.58	86.0	
51.00	54.00	3.00	GRN	2.91	97.0	2.89	96.3	2.51	83.7	
54.00	57.00	3.00	GGRN	3.00	100.0	2.91	97.0	2.91	97.0	
57.00	60.00	3.00	GGRN	3.00	100.0	3.00	100.0	3.00	100.0	

DETAILED GEOTECHNICAL LOG DRILLHOLE ID: **MPV-04-166c**

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

FROM	TO	ROCK	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of			JOINT CONDITIONS				COMMENT
(m)	(m)	TYPE	STRONG R	WEAK R	% WEAK	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH	Sets	Type	Totals	ANGLE	ROUGH	ALT	FILL	
9.3	15.0	**GRN**	R4																	fairly broken up core, many joints, some joints parallel to core axis; chlorite coating on joint surface, rough 5, angle mainly 60-70
15.0	18.0	**GRN**	R4			34	0	17	2	1	1	1	3	J1	8	65	2	0	3	joint set 4: 1 joint, angle 25, rough 4, alt 0, fill3; joint set 5: 2 joints, angle 35, rough 5, alt 0, fill3
														J2	4	75	3	0	3	
														J3	2	80	2	0	3	
18.0	21.0	**GRN**	R4			30	0	24	1	0	1	0	3	J1	2	45	9	0	3	(3) J4: 45 degree; rough:6; alt:0; fill:3. (1) J5: 35 degree; rough:8; alt:0;fill:3. Calcite fill noted on all joint sets.
														J2	3	50	7	0	3	
														J3	15	35	5	0	3	
21.0	24.0	**NGRN**	R5			23	0	10	2	0	2	0	3	J1	6	40	5	0	3	Ji angles (3) 40, (2) 45, (1)65. J2: angles: 45, 70. chlorite coating on joiunt surfaces J1 and J3.
														J2	2	45	5	0	5	
														J3	2	80	4	0	3	
24.0	27.0	**NGRN**	R4			26	0	8	2	0	2	0	3	J1	5	35	5	0	3	
														J2	2	30	2	0	3	
														J3	1	40	5	0	4	J1 angles (1) 30; (2) 35; (1)45; (1)65. J4: 60 deg; rough 4; alt 0: fill 3.
27.0	30.0	**GRN**	R4			31	0	23	2	0	2	0	3	J1	5	60	6	0	3	J1 angles (1) 60, (3)65, (1)50. J2 angles (3) 65, (5)55, (3)40, (2)40, (1)70. J4 50 degrees, rougn:2; alt:0; fill (3)
														J2	14	65	5	0	3	
														J3	4	40	4	0	3	
30.0	33.0	**GRN**	R4			30	0	19	1	1	1	1	3	J1	1	35	3	0	3	joint set 4 : 4 joints, angle 40, rough 5, fill 3, alt 0, joint set 5: 3 joints, angle 20, rough 4, alt 0, fill 9
														J2	3	25	4	0	9	
														J3	8	45	4	0	3	
33.0	36.0	**GRN**	R4			28	0	17	0		1	0	3	J1	8	60	2	0	3	joint set 4: 3 joints, angle 30, rough 2, alt 0, fill 3, joint set 5: 4 joints, angle 80, rough 3, alt 0, fill 3
														J2	1	45	3	0	3	
														J3	1	50	2	0	9	
36.0	39.0	**GRN**	R4			32	0	16	9	1	1	1	3	J1	6	75	3	0	3	joint set 4: 3 joints, angle 80, rough 4, alt 1, fill 3; joint set 5, 1 joint, angle 30, rough 5, alt 0, fill 3
														J2	5	40	2	0	3	
														J3	1	50	2	0	9	
39.0	40.5	**GRN**	R4			22	0	16	2	1	1	1	3	J1	10	80	3	0	3	
														J2	4	45	2	0	3	
														J3	1	30	3	0	3	joint set 4: 1 joint, angle 75, rough 5, alt 1, fill 3; chlorite and hematite c
40.5	45.0	**GGRN**	R5			19	0	4	2	1	0		3	J1	1	40	5	0	3	
														J2	2	55	5	0	3	
														J3	1	20	2	1	3	clay seam at contact (top) at 65 degree, about 1cm large, green clay;
45.0	48.0	**GGRN**	R5	R4	20	8	0	2	2	1	1	0	1	J1	2	55	3	0	3	
48.0	51.0	**GGRN**	R4			18	0	2	1	0	0		2	J1	1	35	6	0	3	
														J2	1	45	5	0	3	
51.0	54.0	**GRN**	R4			16	0	10	1	0	1	0		J1	5	35	5	0	3	
														J2	2	60	5	0	6	
														J3	1	45	4	0	3	J1 angles :(2) 35, (1) 30, (1)45, (1) 60. J2 angles 70, 60. J4: 35 degre
54.0	57.0	**GGRN**	R6			19	0	6	2	0	1	0		J1	1	60	8	0	3	
														J2	1	35	6	0	3	
														J3	2	35	5	0	3	(1) J4:30 degrees, rough; 5; alt:0; fill: 5. (1) J5: 75 degrees; rough: 4;
57.0	60.0	**GGRN**	R4			14	0	4	3	0	2	0	3	J1	2	30	6	0	3	
														J2	2	65	5	0	3	
														J3	1	50	2	0	3	J1 angles: 30, 60. Calcite coating on J1,J2,J3.

Photo Record

MPV-04-166c

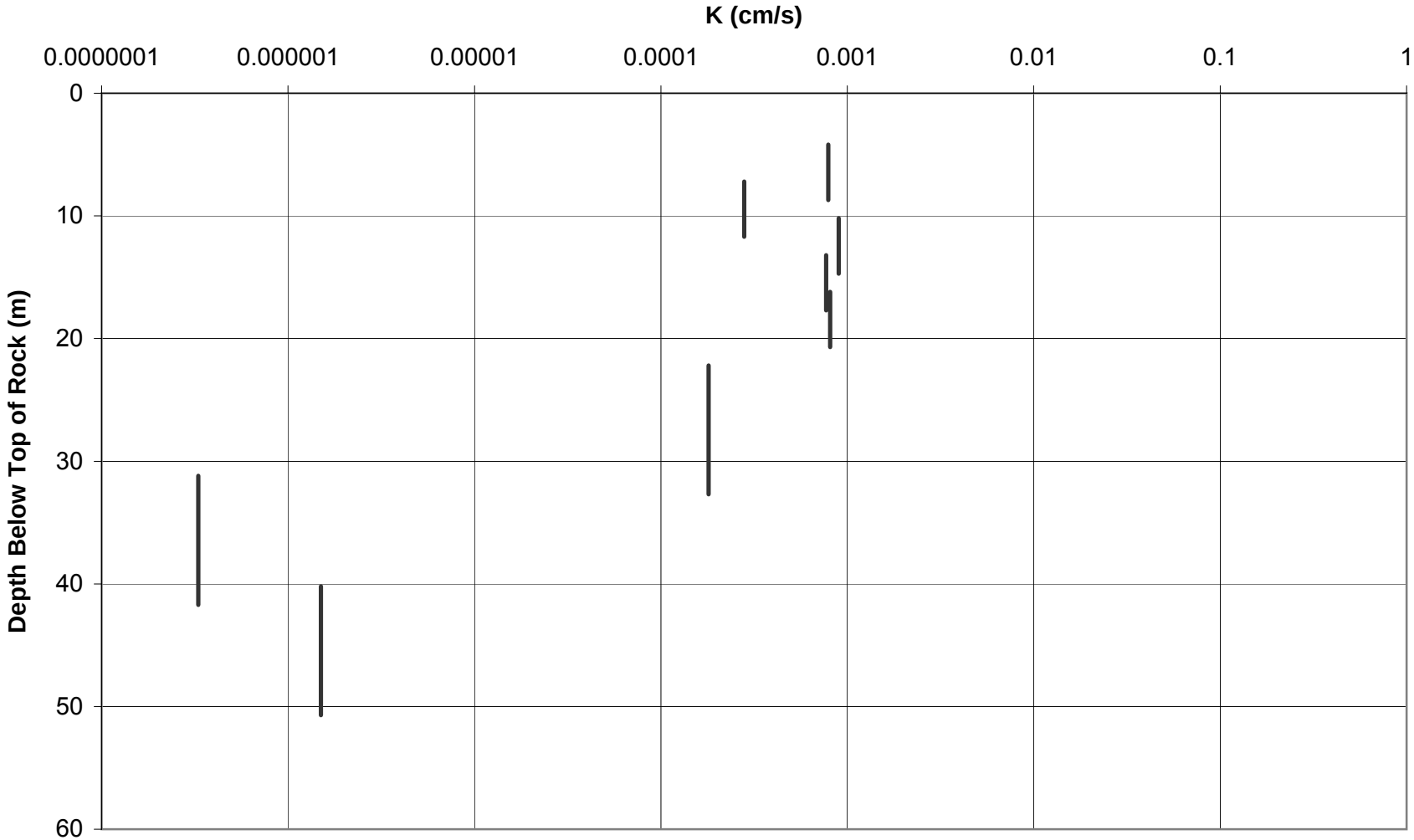
Date	Shift	Filename	Depth	Description
03/10/2004	NS 1900-0700	MPV-04-166C-9mbox1-dry	9 - 13.7m	
03/10/2004	NS 1900-0700	MPV-04-166C-13.7mbox2-dry	13.7 - 17.65m	
03/11/2004	DS 0700-1900	MPV-04-166C-17.65mbox3-dry	17.65 - 21m	
03/11/2004	DS 0700-1900	MPV-04-166C-21mbox4-dry	21 - 24m	
03/11/2004	DS 0700-1900	MPV-04-166C-24mbox5-dry	24-29.1	
03/11/2004	NS 1900-0700	MPV-04-166C-29.1mbox6-dry	29.1-32.9	
03/11/2004	NS 1900-0700	MPV-04-166C-32.9mbox7-dry	32.9-37.1	
03/11/2004	NS 1900-0700	MPV-04-166C-37.1mbox8-dry	37.1-41.25m	
03/11/2004	NS 1900-0700	MPV-04-166C-41.25mbox9-dry	41.25-45.43m	
03/12/2004	DS 0700-1900	MPV-04-166C-45.43mbox10-dry	45.43 - 49.9m	
03/12/2004	DS 0700-1900	MPV-04-166C-49.9mbox11-dry	49.9 - 54m	
03/12/2004	DS 0700-1900	MPV-04-166C-54mbox12-dry	54 - 58.2m	
03/12/2004	DS 0700-1900	MPV-04-166C-58.2mbox13-dry	58.2 - 60m	

Core Box Record

MPV-04-166c

Box	From	To	Comments
Tube 1	5.60	7.10	22% recovery (Geobore)
Bag 1	7.10	8.60	tube did not contain any sample; sand between inner tube and plastic tube sampled
1	8.60	13.70	
2	13.70	17.65	
3	17.65	21.00	
4	21.00	25.00	
5	25.00	29.10	
6	29.10	32.90	
7	32.90	37.10	
8	37.10	41.25	
9	41.25	45.43	
10	45.43	49.90	
11	49.90	54.00	
12	54.00	58.20	
13	58.20	60.00	EOH

Permeability vs Depth
MPV_04_166C



Packer Test Data

Date	10-Mar-04
Staff	M. Story, B. Rameseder
Init. WL:	0
Ref. Pt.	drill shack floor
Dip	90

MPV-04-166c

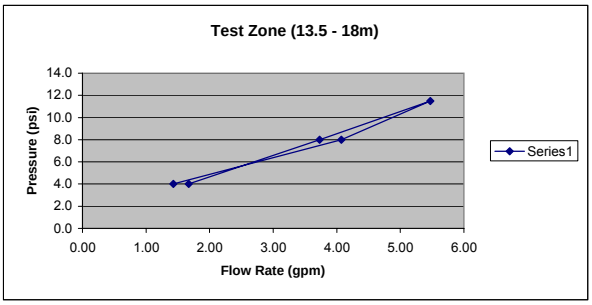
Test 1 13.5 18

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pressure (psi)	Comments
1	0	5477.20		4.0	**no leaks**
	1	5479.00	1.80		
	2	5480.70	1.70		
	3	5481.70	1.00		
	4	5482.70	1.00		
	5	5484.30	1.60		
	6	5485.90	1.60		
	7	5487.60	1.70		
	8	5489.30	1.70		1.67
2	0	5507.30		8.0	**no leaks**
	1	5511.00	3.70		
	2	5514.90	3.90		
	3	5518.60	3.70		
	4	5522.30	3.70		
	5	5526.10	3.80		3.73
3	0	5531.10		11.5	**no leaks**
	1	5536.60	5.50		
	2	5542.10	5.50		
	3	5547.50	5.40		
	4	5553.00	5.50		5.47
4	0	5557.2		8.0	**no leaks**
	1	5561.10	3.90		
	2	5565.40	4.30		
	3	5569.40	4.00		
	4	5573.60	4.20		
	5	5577.70	4.10		
	6	5581.70	4.00		
	7	5585.80	4.10		4.07
5	0	5587.50		4.0	**no leaks**
	1	5588.90	1.40		
	2	5590.20	1.30		
	3	5591.50	1.30		
	4	5593.00	1.50		
	5	5594.40	1.40		
	6	5595.80	1.40		1.43

Summary 13.5 18

Flow rate Pressure

(gpm)	(psi)
1.67	4.0
3.73	8.0
5.47	11.5
4.07	8.0
1.43	4.0

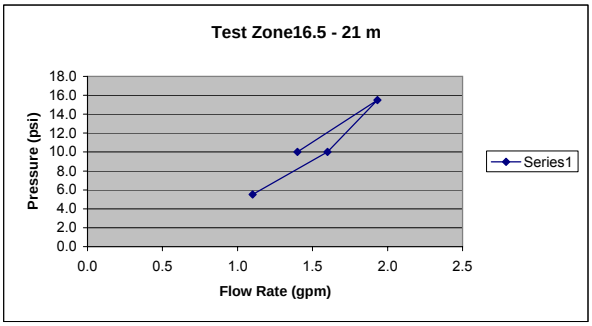


Test 2 16.5 21

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pressure (psi)	Comments
1	0	5571.80		5.5	
	1	5572.90	1.10		
	2	5574.10	1.20		
	3	5575.20	1.10		
	4	5576.30	1.10		
	5	5577.40	1.10		
2	0	5579.00		10.0	
	1	5580.60	1.60		
	2	5582.20	1.60		
	3	5583.80	1.60		
	4	5585.40	1.60		
3	0	5588.10		15.5	
	1	5590.00	1.90		
	2	5591.80	1.80		
	3	5593.80	2.00		
	4	5595.70	1.90		
	5	5597.60	1.90		
4	0	5599.00		10.0	
	1	5600.30	1.30		
	2	5601.70	1.40		
	3	5603.10	1.40		
	4	5604.50	1.40		
5	0	5605.50		5.0	
	1	5606.30	0.80		
	2	5607.20	0.90		
	3	5607.60	0.40		
	4	5608.40	0.80		
	5	5609.20	0.80		
	6	5610.10	0.90		
	7	5611.00	0.90		

Summary 16.5 21

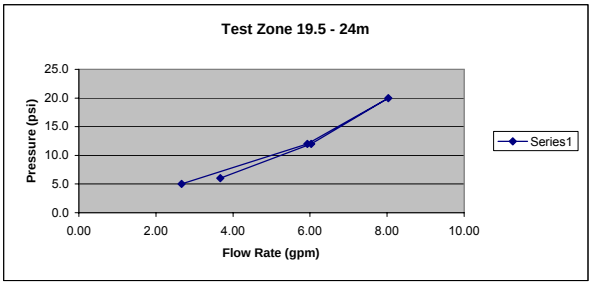
Flow rate (gpm)	Pressure (psi)
1.1	5.5
1.6	10.0
1.9	15.5
1.4	10.0
0.9	5.0



Test 3 19.5 24

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pressure (psi)	Comments
1	0	5663.00			
	1	5665.70	2.70	5.0	
	2	5668.30	2.60		
	3	5670.90	2.60		
	4	5673.70	2.80		
	5	5676.30	2.60		
2	0	5682.00		12.0	
	1	5688.10	6.10		
	2	5694.10	6.00		
	3	5700.00	5.90		
	4	5706.00	6.00		
	5	5711.90	5.90		
3	0	5722.00		20.0	
	1	5730.00	8.00		
	2	5738.30	8.30		
	3	5746.40	8.10		
	4	5754.40	8.00		
	5	5762.4	8.00		
4	0	5767.00		12.0	
	1	5773.30	6.30		
	2	5779.30	6.00		
	3	5785.40	6.10		
	4	5791.40	6.00		
5	0	5877.00		5.0	
	1	5880.30	3.30		
	2	5884.20	3.90		
	3	5887.80	3.60		
	4	5891.30	3.50		

Summary	19.5	24
	Flow rate (gpm)	Pressure (psi)
	2.67	5.0
	5.93	12.0
	8.03	20.0
	6.03	12.0
	3.67	6.0

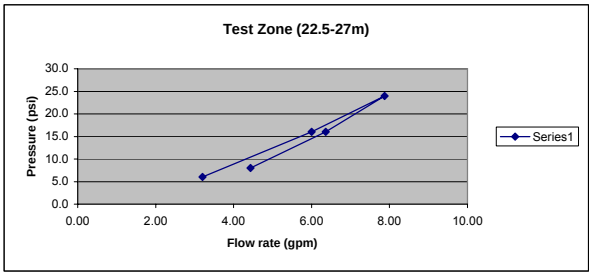


Test 4 22.5 27

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pressure (psi)	Comments
1	0	5874.00		6.0	
	1	5877.10	3.10		
	2	5880.30	3.20		
	3	5883.60	3.30		
	4	5886.80	3.20		
2	0	5894.00		16.0	
	1	5900.00	6.00		
	2	5906.00	6.00		
	3	5912.00	6.00		
	4	5918.00	6.00		
3	0	5925.00		24.0	
	1	5933.00	8.00		
	2	5940.90	7.90		
	3	5948.70	7.80		
	4	5956.60	7.90		
	5	5964.5	7.90		
4	0	5975.00		16.0	
	1	5981.30	6.30		
	2	5987.70	6.40		
	3	5994.10	6.40		
	4	6000.40	6.30		
5	0	6007.00		8.0	
	1	6011.30	4.30		
	2	6015.80	4.50		
	3	6020.20	4.40		
	4	6024.60	4.40		

Summary 22.5 27

Flow rate (gpm)	Pressure (psi)
3.20	6.0
6.00	16.0
7.87	24.0
6.36	16.0
4.43	8.0

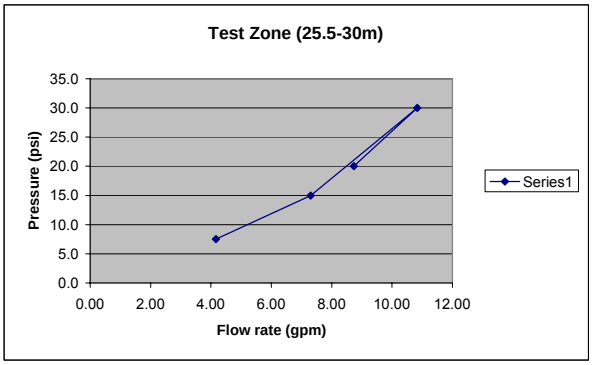


Test 5 25.5 30

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pressure (psi)	Comments
1	0	6084.00		7.5	
	1	6088.00	4.00		
	2	6092.10	4.10		
	3	6096.30	4.20		
	4	6100.40	4.10		
	5	6104.60	4.20		
2	0	6112.00		15.0	
	1	6119.40	7.40		
	2	6126.70	7.30		
	3	6134.10	7.40		
	4	6141.40	7.30		
	5	6148.90	7.50		
3	0	6160.00		30.0	
	1	6170.80	10.80		
	2	6181.50	10.70		
	3	6192.50	11.00		
	4	6203.30	10.80		
	5	6214	10.70		
4	0	6222.00		20.0	
	1	6230.60	8.60		
	2	6239.30	8.70		
	3	6247.80	8.50		
	4	6256.60	8.80		
	5	6265.40	8.80		
5	0	6271.00		10.0	intake pump malfunction. Unable to maintain constant pressure. Results for this set disqualified.
	1	6273.60	2.60		
	2	6277.30	3.70		
	3	6284.60	7.30		
	4	6285.80	1.20		
	5	6287.00	1.20		

Summary 25.5 30

Flow rate (gpm)	Pressure (psi)
4.17	7.5
7.30	15.0
10.83	30.0
8.73	20.0

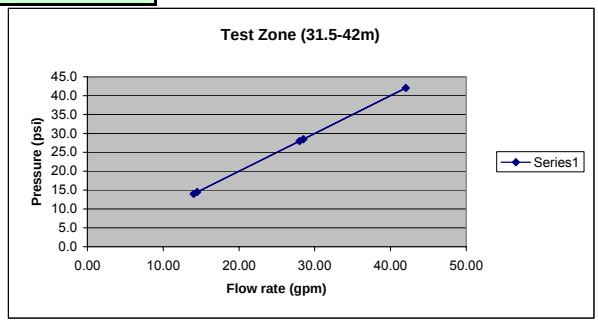


Test 6 31.5 42

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pressure (psi)	Comments
1	0	6303.20		14.0	no leaks
	1	6307.70	4.50		
	2	6312.10	4.40		
	3	6316.50	4.40		
	4	6320.80	4.30		4.37
2	0	6333.30		28.5	no leaks
	1	6340.00	6.70		
	2	6346.70	6.70		
	3	6353.50	6.80		
	4	6360.10	6.60		
	5	6366.80	6.70		6.70
3	0	6374.70		42.0	no leaks
	1	6382.80	8.10		
	2	6390.70	7.90		
	3	6398.20	7.50		
	4	6405.60	7.40		
	5	6413	7.40		7.43
4	0	6419.00		28.0	no leaks
	1	6425.10	6.10		
	2	6431.20	6.10		
	3	6436.60	5.40		
	4	6442.30	5.70		
	5	6448.20	5.90		
	6	6454.00	5.80		5.80
5	0	6458.60		14.5	no leaks
	1	6462.50	3.90		
	2	6466.50	4.00		
	3	6470.50	4.00		
	4	6474.60	4.10		
	5	6478.70	4.10		4.07

Summary 31.5 42

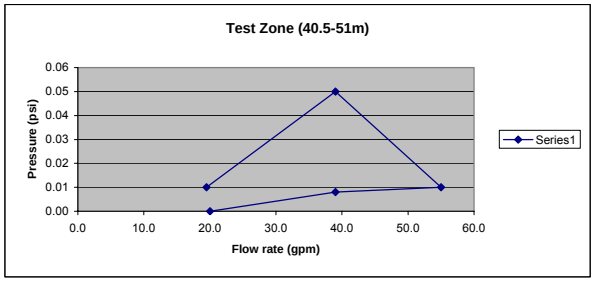
Flow rate (gpm)	Pressure (psi)
14.00	14.0
28.50	28.5
42.00	42.0
28.00	28.0
14.50	14.5



Test 7 40.5 51

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pressure (psi)	Comments
1	0	6483.70		19.5	no leaks
	1	6483.71	0.01		
	2	6483.72	0.01		
	3	6483.73	0.01		0.01
2	0	6483.80		39.0	no leaks
	1	6483.85	0.05		
	2	6483.90	0.05		
	3	6483.95	0.05		0.05
3	0	6484.10		55.0	no leaks
	1	6484.12	0.02		
	2	6484.13	0.01		
	3	6484.14	0.01		
	4	6484.15	0.01		0.01
4	0	6484.15		39.0	no leaks
	1	6484.15	0.00		
	2	6484.16	0.01		
	3	6484.17	0.01		
	4	6484.18	0.01		0.008
5	0	6484.30		20.0	no leaks
	1	6484.30	0.00		
	2	6484.30	0.00		
	3	6484.30	0.00		0

Summary	40.5	51
	Flow rate (gpm)	Pressure (psi)
	0.01	19.5
	0.05	39.0
	0.01	55.0
	0.01	39.0
	0.00	20.0



Test 8 49.5 60.5

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pressure (psi)	Comments
1	0	6486.30		20.0	
	1	6486.40	0.10		
	2	6486.55	0.15		
	3	6486.70	0.15		
	4	6486.85	0.15		
	5				
	6		0.00		
	7		0.00		
2	0	6487.00		40.0	
	1	6487.05	0.05		
	2	6487.10	0.05		
	3	6487.20	0.10		
	4	6487.25	0.05		
	5				
3	0	6487.50		60.0	
	1	6487.55	0.05		
	2	6487.60	0.05		
	3	6487.65	0.05		
	4	6487.70	0.05		
	5				
4	0	6487.75		40.0	
	1	6487.80	0.05		
	2	6487.80	0.00		
	3	6487.80	0.00		
	4	6487.80	0.00		
	5				
5	0	6487.80		20.0	
	1	6487.80	0.00		
	2	6487.80	0.00		
	3	6487.80	0.00		
	4	6487.80	0.00		
	5				
	6		0.00		
	7		0.00		

Summary	49.5
Flow rate (gpm)	Pressure (psi)
0.15	20.0
0.07	40.0
0.05	60.0
0.00	40.0
0.00	20.0

Permeability Summary

MPV-04-166c

from	to		Step 1	Step 2	Step 3	Step 4	Step 5	Avg K
13.5	18	gauge (psi)	4	8	11.5	8	4	
		Qavg (igpm)	1.67	3.73	5.47	4.07	1.43	
		K cm/sec	**7.4E-04**	**8.2E-04**	**8.4E-04**	**9.0E-04**	**6.3E-04**	7.9E-04
16.5	21	gauge (psi)	5.5	10	15.5	10	5	
		Qavg (igpm)	1.1	1.6	1.9	1.4	0.9	
		K cm/sec	**3.5E-04**	**2.8E-04**	**2.2E-04**	**2.5E-04**	**3.2E-04**	2.8E-04
19.5	24	gauge (psi)	5	12	20	12	6	
		Qavg (igpm)	2.67	5.93	8.03	6.03	3.67	
		K cm/sec	**9.4E-04**	**8.7E-04**	**7.1E-04**	**8.9E-04**	**1.1E-03**	9.0E-04
22.5	27	gauge (psi)	6	16	24	16	8	
		Qavg (igpm)	3.2	6	7.87	6.36	4.43	
		K cm/sec	**9.4E-04**	**6.6E-04**	**5.8E-04**	**7.0E-04**	**9.8E-04**	7.7E-04
25.5	30	gauge (psi)	7.5	15	30	20		
		Qavg (igpm)	4.17	7.3	10.83	8.73		
		K cm/sec	**9.82E-04**	**8.59E-04**	**6.37E-04**	**7.71E-04**		8.1E-04
31.5	42	gauge (psi)	14	28.5	42	28	14.5	
		Qavg (igpm)	4.37	6.7	7.43	5.8	4.07	
		K cm/sec	**2.4E-04**	**1.8E-04**	**1.3E-04**	**1.6E-04**	**2.1E-04**	1.8E-04
40.5	51	gauge (psi)	19.5	39	55	39	20	
		Qavg (igpm)	0.01	0.05	0.01	0.008	0	
		K cm/sec	**3.9E-07**	**9.7E-07**	**1.4E-07**	**1.6E-07**	**0.0E+00**	3.3E-07
49.5	60	gauge (psi)	20	40	60	40	20	
		Qavg (igpm)	0.15	0.07	0.05	0	0	
		K cm/sec	**5.7E-06**	**1.3E-06**	**6.3E-07**	**0.0E+00**	**0.0E+00**	1.5E-06
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	#DIV/0!

Equations:

$Hf = 8.65x10^{-15} (Q^2 * Lp/rp^5)$

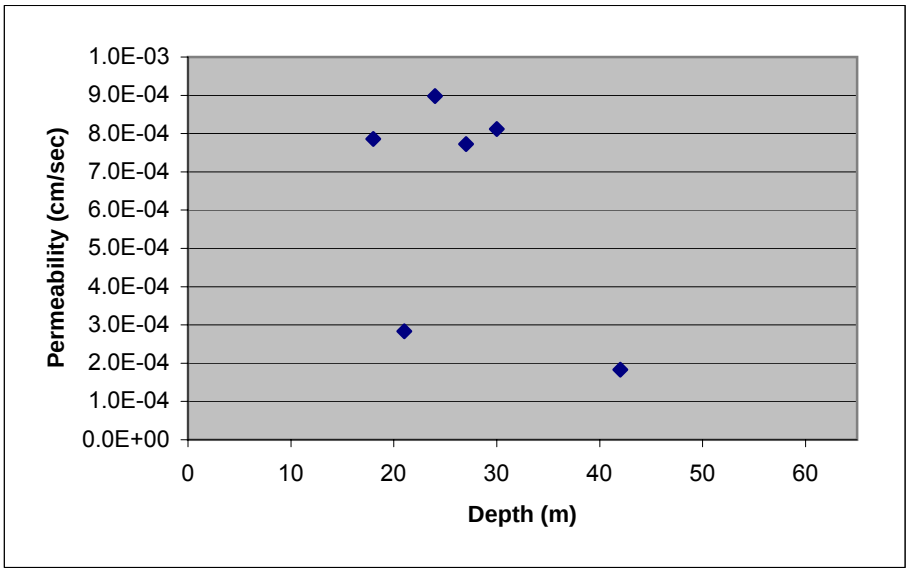
$H_{nit} = (Dw'+Hg-Hf)+Pg/1.42$

$K = (Q*Ln(R/r_b))/2*\pi*H_{nit}*L)$

Overall **6.2E-04**

assume
- vertical drillhole
- water at ground surface
- height of gauge is at rig flr
- negligible friction losses

Dw	Measured depth of static water (1)	*0*	m
Dp	Measured depth to packer		m
Dt	Depth to midpoint of test		m
Inc	Inclination from horizontal	*90*	m
Dw'	Vertical depth to static water level		°
Dp'	Vertical depth to packer		m
Dt'	Vertical depth to midpoint of test		m
Hg	Gauge height	*0*	m
Lp	Length of discharge pipe		m
rp	Radius of discharge pipe (1" = 0.0127m)		m
R	Radius of influence (10m is standard)	10	m
rb	Drillhole radius (HQ=0.048m, NQ=0.038m)	0.038	m
L	Length of test section		m
Hf		0	m



Reflex Readings

MPV-04-166c

Date	03/122004
Hole Depth	60m
Azi/Dir	306.9
Incl/dip	89.4
Roll (Toolface re to Mag N)	175.3
Magnetic Field	
Temp ©	

FIELD GEOLOGICAL LOG

HOLE ID **MPV-04-166c**

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0	4.1			2.5m ice,	BR
4.10	8.60	Overburden		Gravel, sharp, angular, mixed with sandy silt (till); cobbles of different lithologies	MS
8.60	22.30	GRN		pink to reddish-white granite; medium to coarse grained, hematite stained, many microdefects and joints filled with chlorite; calcite and hematite on joint surfaces	BR
22.30	30.00	GGRN		Gneissic granite: biotite rich, dark grey; compact; joint often filled with calcite. granite is medium grained.	MS
30.00	40.53	GRN		pink to reddish-white granite; medium to coarse grained, hematite stained; many microdefects and joints filled with chlorite; calcite and hematite on joint surfaces; sulphides at end of section (coarse to fine)	BR
40.53	51.00	GGRN		Granitic gneiss: grey, fine to coarse, grained biotite and in sections mafic mineral rich; compact; contains sulphides (pyrite); at top 1cm clay seam (fine to medium grained); some pegmatitic sections (up to 30cm); mafic sections (40cm); some hematite veining and chloritisation; elongated, green minerals about 3mm long in dark fine grained mafic xenolith; pyrite also on some joint surfaces; some quartz veinlets	BR
51.00	54.00	GRN		pink to reddish-white granite; medium to coarse grained, hematite stained, some microdefects and joints filled with chlorite; calcite and hematite on joint surfaces	MS
54.00	60.00	GGRN		Gneissic granite: biotite rich, dark grey; compact; joint often filled with calcite. granite is medium grained. Some ;arge grained pegmatic sections.	MS

UCS SAMPLES

HOLE ID: MPV-04-166C

HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-166C	9	44.01	Granite	04-UCS-166-001
MPV-04-166C	12	57.25	Granite	04-UCS-166-002

POINT LOAD TEST - INPUT

DRILL HOLE ID: MPV-04-166c

No. #	Tested by	DATE	HOLE/ FACE ID	DIST. (m)	ROCK TYPE	TEST TYPE	ORINT	DAYS	W (mm)	D (mm)	P (kN)	COMMENT	
	BAM	04/06/2004	MPV-04-166C	43.90	GRANITE	1	LEFT			47.30	1600.00	GOOD BREAK	
	BAM	04/06/2004	MPV-04-166C	43.90	GRANITE	1	LEFT			47.30	1375.00	FAIR BREAK	
	BAM	04/06/2004	MPV-04-166C	43.90	GRANITE	1	LEFT			47.30	1550.00	GOOD BREAK	
	BAM	04/06/2004	MPV-04-166C	44.40	GRANITE	1	RIGHT			47.30	1250.00	BROKE ON FABRIC	
	BAM	04/06/2004	MPV-04-166C	44.40	GRANITE	1	RIGHT			47.30	1350.00	FAIR BREAK	
	BAM	04/06/2004	MPV-04-166C	44.40	GRANITE	1	RIGHT			47.30	1650.00	FAIR BREAK	
	BAM	04/06/2004	MPV-04-166C	57.10	GRANITE	1	LEFT			47.60	1420.00	GOOD BREAK	
	BAM	04/06/2004	MPV-04-166C	57.10	GRANITE	1	LEFT			47.60	1550.00	GOOD BREAK	
	BAM	04/06/2004	MPV-04-166C	57.10	GRANITE	1	LEFT			47.60	2300.00	FAIR BREAK	ANGLED
	BAM	04/06/2004	MPV-04-166C	57.10	GRANITE	1	RIGHT			47.60	2300.00	FAIR BREAK	ANGLED
	BAM	04/06/2004	MPV-04-166C	57.10	GRANITE	1	RIGHT			47.60	2150.00	GOOD BREAK	
	BAM	04/06/2004	MPV-04-166C	57.10	GRANITE	1	RIGHT			47.60	1650.00	FAIR BREAK	

GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	*DESCRIPTION*	*Mpa*
R0	EXTREMELY WEAK ROCK	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	VERY WEAK ROCK	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	WEAK ROCK	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	MEDIUM STRONG ROCK	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	STRONG ROCK	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	VERY STRONG ROCK	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	EXTREMELY STRONG ROCK	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY	
CODE	*DESCRIPTION*
0	NONE
1	MINOR
2	MODERATE
3	HEAVY

DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	*CATEGORY*
0	STRONG (NEVER BREAKS)
1	MODERATE (SOMETIMES BREAKS)
3	WEAK (ALWAYS BREAKS)

JOINT CONDITION - SMALL SCALE		
CODE	*CATEGORY*	*SUBCATEGORY*
1	STEPPED	ROUGH
2		SMOOTH
3		SLICKENSIDED
4	UNDULATING	ROUGH
5		SMOOTH
6		SLICKENSIDED
7	PLANAR	ROUGH
8		SMOOTH
9		SLICKENSIDED

JOINT FILLING		
CODE	*CATEGORY*	*SUBCATEGORY*
1	NON	COARSE
2	SOFTENING	MEDIUM
3		FINE
4	SOFT	COARSE
5	SHEARED	MEDIUM
6		FINE
7	GOUGE THIKNESS < IRREGULARITIES	
8	GOUGE THIKNESS > IRREGULARITIES	
9	NO INFILL	

JOINT ALTERATION	
CODE	*DESCRIPTION*
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE

Laubscher	Jr	JRC
1	4	20
2	3	14
3	2	11

STEPPED

4	3	14
5	2	11
6	1.5	7

UNDULATING

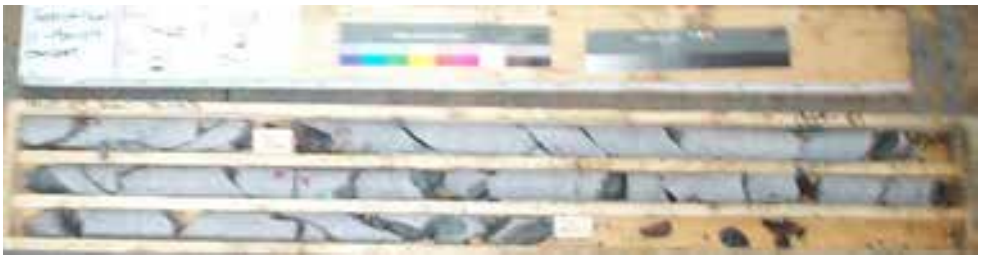
7	1.5	2.5
8	2	1.5
9	0.5	0.5

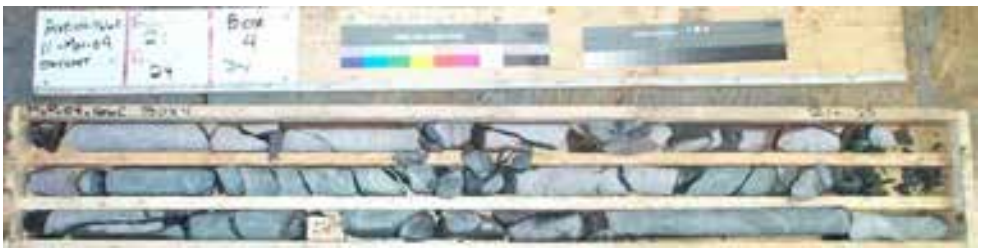
PLANAR

STEFFEN, ROBERTSON AND KIRSTEN
Consulting Engineers

MPV_04_166C

MPV_04_166C





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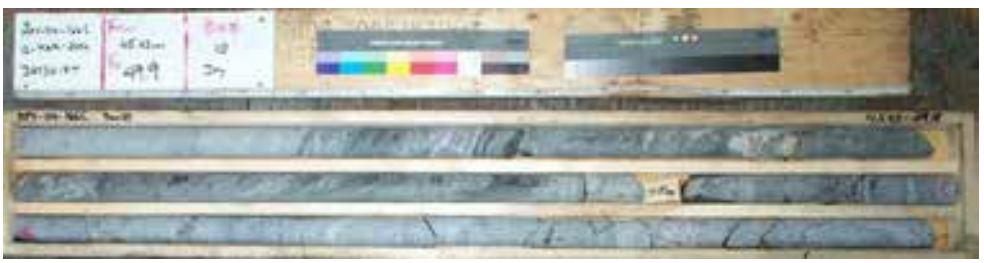

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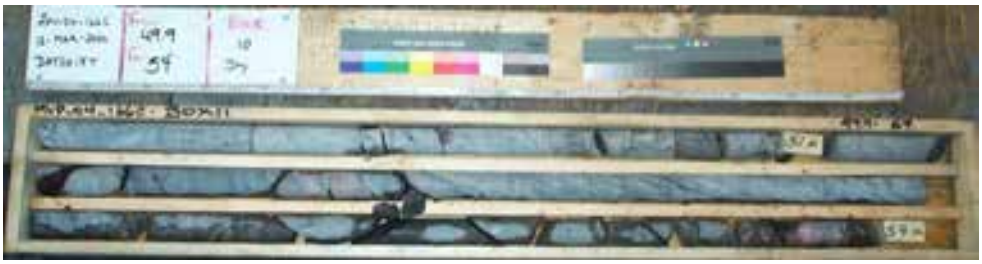
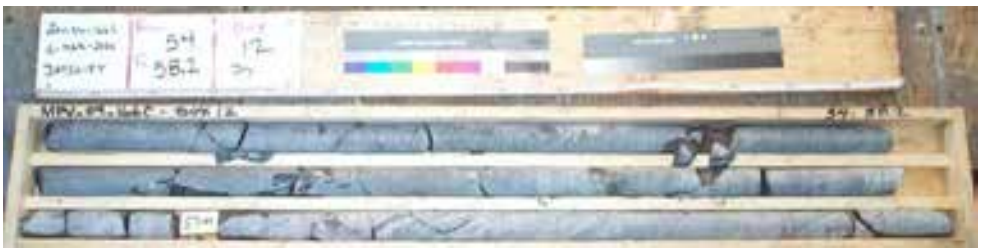




Diary MPV-04-167c

NS 12/03/2004

1930hrs M Waldegger spotted new hole location by GPS; approx 5m N of original D3-GB-04 location

1900hrs started to pack and move

2300hrs banked in and augering hole for water
Depth to ice - 0.6m
Depth to water - 2.63m
Depth to lake bed - 8.87m
Deph to bedrock 17.8m
drillers must stake hole location at previous location. Done (MS).

0030hrs Start casing
Ice at 0.6 m below floor level. Ice 2.03m thick. Top of overburden at 8.87m below floor level. Reference point is rig floor.

0130hrs Casing at 9.6 m.

0220hrs Unable to drop rods through casing. Ice formed inside of casing. Ice drilled out.

0315hrs Chuck holding rod broken.

0340hrs Freeman (BL foreman) arrives to help repair the chuck. Sleeve inside chuck needs to be replaced. Freeman left to get new sleeve.

0415hrs New sleeve installed in chuck. Hole frozen.

0430hrs Drillers run out of propane. Driller's helper left to get more propane.

0500hrs Generator for shack fueled up.

0515hrs Drilling resumes.

0630hrs NQ at 11m. Driller states that NQ is still in boulders and not yet in solid bedrock.

DS 13/03/2004

0700hrs Richard working alone until Al arrived at 0800

0800hrs changed leaking value on lever bank

0900hrs replaced burst hydraulic lline beween lever bank and rig head
NQed through boulders to bedrock starting at 17.8m; reamed casing to 17.0m (6m + .6m + 0.4m below rig flr)

1300hrs at about 18m

1520hrs at 26.8m

1600hrs attempted packer test 22.3 to 26.5 - almost no flow even though fractured zone encountered during drilling. Confirmed flow through apparatus by increasing pressure to 55psi; still very modest flow rates

1745hrs at 29.6m

NS 13/03/2004

2130hrs At 32.6m. Ice inside rods. Unable to lower packer down hole. Add calcium to water.

1115hrs Set up packer at 32.6m

1130hrs Gauge for nitrogen tank is broken. Driller's helper gone to get a new gauge.

1300hrs Packer test at 32.6m completed.

0230hrs Set up packer at 35.6m

0400hrs Packer test at 35.6m completed. Almost no flow through 31.5 to 35.6m. Increased pressure to 40 psi to confirm flow.

DS 14/03/2004

0830rs no reflex because of miscommuniction between drillers and fear of instrument freezing doenhole
hole grouted
point load test samples selected and dropped off

SRK Consulting
Engineers and Scientists

FIELD DRILL PERFORMANCE LOG

PROJECT	**Gahcho Kue Geotech**
PROJECT NO	**2CD002.11**
NORTHING	589914
EASTING	7034833
SURFACE ELEVATION	404
AZIMUTH	0
DIP	90

HOLE NO:	**MPV-04-167c**
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	0000hrs Mar 13, 2004
FINISH DATE AND TIME	0700hrs Mar 14, 2004
HOLE DIAMETER	47.6 (NQ)
DRILLING METHOD	Diamond core

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
NS 1900-0700	M Storey	12/03/2004		7	3.5	11	Chuck required repairs. Ice formed inside casing.	11	3.5	3.14	7	3.5	3.5	3.14
DS 0700-1900	R Bowden	13-3-04		12	6	26.00	completed move and repaired hoses	15	6	2.50	19	9.5	9.5	2.74
NS 1900-0700	M Storey	13-3-04		12	5	38.60	Packer testing. Ice in rods. Replace gauge.	12.6	7	1.80	31	14.5	16.5	2.34

OVERALL HOLE DRILL RATE (m/hr)	1.25
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	2.34

GENERAL GEOTECH LOG DRILLHOLE ID: **MPV-04-167c**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
0.00	0.60	0.60	snow							
0.60	2.87	2.27	ice							
2.87	17.80	14.93	OVB							
17.80	20.80	3.00	GRN	3.00	100.0	2.79	93.0	2.62	87.3	biotite rich grnite
20.80	23.80	3.00	GRN	3.00	100.0	2.95	98.3	2.95	98.3	pegmatitic zones
23.80	26.50	2.70	GRN	2.40	88.9	1.31	48.5	0.89	33.0	low recovery, material washed away and frac
26.50	29.60	3.10	NGRN	3.08	99.4	2.87	92.6	2.20	71.0	Gneisic Granite, biotite rich, some fractures a
29.60	32.60	3.00	NGRN	2.90	96.7	2.80	93.3	2.65	88.3	Gneisic Granite, biotite rich.
32.60	35.60	3.00	GRN	3.00	100.0	2.85	95.0	2.50	83.3	
35.60	38.60	3.00	GRN	2.80	93.3	2.74	91.3	2.37	79.0	EOH

DETAILED GEOTECHNICAL LOG

DRILLHOLE ID: **MPV-04-167c**

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

FROM (m)	TO (m)	ROCK TYPE	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of Sets	Type	Totals	JOINT CONDITIONS				COMMENT
			STRONG R	WEAK R	% WEAK	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH				ANGLE	ROUGH	ALT	FILL	
17.8	20.8	GRN	R5			20	0	5	0	0	0		3	J1	3	50	4	0	1	GRN=Granite with highly variable biotie enrichment and grain size; J1 has 1 joint with gouge and one with calcite; J2 has calcite coating;
														J2	1	58	4	0	9	
														J3	1	35	6	0	9	
20.8	23.8	GRN	R5			13	0	5	1	1	0		3	J1	3	60	1	0	9	J1 has angles, 38, 60 and 68; J3 has calcite coating
														J2	1	50	6	0	9	
														J3	1	65	1	0	9	
23.8	26.5	GRN	R5			30	0	8	0	0	2	1	3	J1	5	50	4	0	9	SOFT ZONE WASHED AWAY AT APPROX 25.6; following 0.9m highly fractured and has silty/sandy gouge; J1 has calcite coating; J3 and many of remaining joints have calcite coating,
														J2	1	50	6	0	9	
														J3	2	60	4	0	9	
26.5	29.6	NGRN	R5			30	0	20	1	0	2	1		J1	6	35	5	0	3	J1 angles (2) 35, (1)50, (2)55. J2 angles 60; 85; 50. J2 angles 38, 85, 50. J3 angles: 40; (2)45; 55; 60; 65. (3) J4: angles 26, 50, 65; rough 3; alt: 0; fill:3. (1) J5 angle: 70; rough 2; alt;0; fill: 3. (1)J6 angle 30; rough 1; alt:0; fill: 6.
														J2	3	50	5	0	6	
														J3	6	60	4	0	3	
29.6	32.6	NGRN	R4			18	0	8	1	0	1	0		J1	4	65	5	0	3	J4: 45 degrees; rough:2; alt:0; fill:3. J3 angles 35, 65.
														J2	1	65	7	0	3	
														J3	2	35	4	0	3	
32.6	35.6	GRN	R5			25	0	17	1	1	1	1	3	J1	15	45	5	0	3	J1 angles: (1) 30; (3) 35; (2) 40; (2) 45; (2) 50; (1) 55; (2) 60; (1)60; (1)65;
														J2	1	40	5	0	6	
														J3	1	35	2	0	3	
35.6	38.6	GRN	R6			12	0	12	1	0	1	0	2	J1	10	45	5	0	3	J1 angles: (5) 45; (2) 40; (1) 35; (1) 30. Calcite coating on joints.
														J2	2	30	4	0	3	

Photo Record

MPV-04-167c

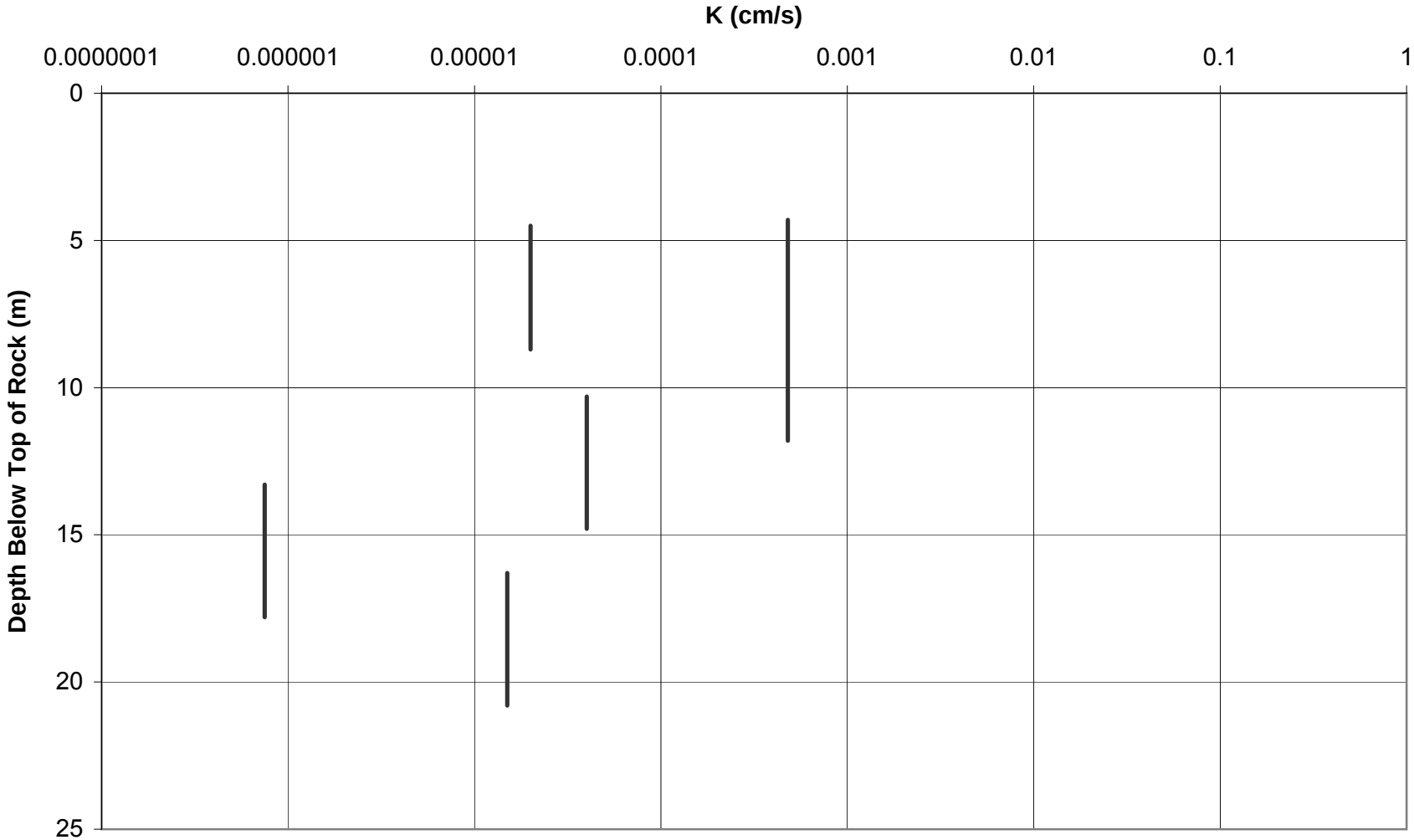
Date	Shift	Filename	Depth	Description
03/13/2004	DS 0700-1900	MPV-04-167C-16.0box1-dry	16.0-20.3m	bitotite granite
03/13/2004	DS 0700-1900	MPV-04-167C-20.3box2-dry	20.3 - 23.8m	
03/13/2004	NS 1900-0700	MPV-04-167C-23.8box3-dry	23.8 - 28.3m	
03/13/2004	NS 1900-0700	MPV-04-167C-28.3box4-dry	28.3 - 32.45m	
03/13/2004	NS 1900-0700	MPV-04-167C-32.45box5-dry	32.45 - 36.67m	
03/13/2004	NS 1900-0700	MPV-04-167C-36.67box6-dry	36.67 - 38.60m	

Core Box Record

MPV-04-167c

Box	From	To	Comments
1	16.00	20.30	
2	20.30	23.80	
3	23.80	28.30	
4	28.30	32.45	
5	32.45	36.67	
6	36.67	38.60	EOH

Permeability vs Depth
MPV_04_167C



Packer Test Data

Date	22-Feb-04
Staff	R. Bowden, M Storey
Init. WL:	0
Ref. Pt.	drill shack floor
Dip	90

MPV-04-167c

Test 1 22.3 26.5

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments
1	0	488.70		12.0	**no leaks**
	1	488.85	0.15		no flow below 11psi
	2	489.05	0.20		
	3	489.20	0.15		
	4	489.35	0.15		
	5	489.50	0.15		
	6	489.63	0.13		
	7	489.78	0.15		
	8	489.90	0.12		
2	0	491.75		17.0	**no leaks**
	1	491.92	0.17		
	2	492.10	0.18		
	3	492.28	0.18		
	4	492.47	0.19		

Summary	22.3	26.5
Flow rate	Pressure	
(gpm)	(psi)	
0.13	12.0	
0.18	17.0	

Test 2 22.1 29.6

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments
1	0	495.80		5.0	
	1	497.00	1.20		
	2	498.40	1.40		
	3	499.80	1.40		
	4	501.30	1.50		
	5	503.10	1.80		
	6	504.90	1.80		
	7	506.75	1.85		
	8	508.80	2.05		
	9	510.80	2.00		
	10	513.10	2.30		
	11	515.30	2.20		
	12	517.50	2.20	**2.23**	
2	0	521.00		8.5	
	1	524.00	3.00		
	2	526.80	2.80		
	3	529.60	2.80		
	4	532.50	2.90		
	5	535.30	2.80	**2.83**	
3	0	653.00		12.0	
	1	657.60	4.60		
	2	662.30	4.70		
	3	667.10	4.80		
		671.90	4.80		
	4	676.70	4.80	**4.80**	
4	0	680.50		9.0	
	1	684.70	4.20		
	2	688.70	4.00		
	3	692.70	4.00		
	4	696.80	4.10	**4.03**	
5	0	703.30			
	1	706.60	3.30		
	2	709.90	3.30		
	3	713.20	3.30		
	4	716.40	3.20	**3.27**	

Summary	**22.1**	**29.6**
Flow rate (gpm)	Pressure (psi)	
2.23	5.0	
2.83	8.5	
4.80	12.0	
4.03	9.0	
3.27	5.0	

Test 3		28.1	32.6		
Step	**Elapsed time (min)**	**Flow (gal)**	**Flow rate (gpm)**	**Gauge press (psi)**	**Comments**
1	0	721.70		7.0	
	1	721.90	0.20		
	2	722.20	0.30		
	3	722.50	0.30		
	4	722.75	0.25		
	5	722.95	0.20		
	6	723.10	0.15		
	7	723.30	0.20		
	8	723.50	0.20	**0.18**	
2	0	723.66		14.0	
	1	724.50	0.85		
	2	724.80	0.30		
	3	725.10	0.30		
	3	725.40	0.30	**0.30**	
3	0	725.80		20.0	
	1	726.20	0.40		
	2	726.60	0.40		
	3	727.00	0.40		
	4	727.40	0.40	**0.40**	
	5				
4	0	727.80		14.0	
	1	728.10	0.30		
	2	728.40	0.30		
	3	728.75	0.35		
	4	729.20	0.45		
	5	729.35	0.15		
	6	729.70	0.35		
	7	730.00	0.30		
	8	730.30	0.30		
	9	730.60	0.30	**0.30**	
5	0	730.80		8.5	
	1	731.00	0.20		
	2	731.20	0.20		
	3	731.40	0.20		
	4	731.60	0.20	**0.20**	
	5				

Summary	**28.1**	**32.6**
Flow rate (gpm)	Pressure (psi)	
0.18	7.0	
0.30	14.0	
0.40	20.0	
0.30	14.0	
0.20	8.5	

Test 4 31.1 35.6

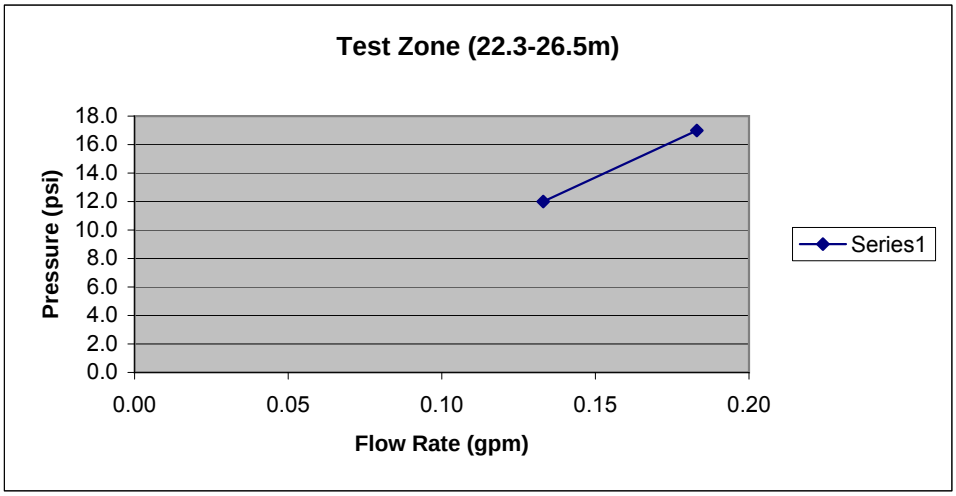
Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments
1	0	6732.65		8.5	
	1	6732.65	0.00		No response
	2	6732.65	0.00		
	3	6732.65	0.00		
	4	6732.65	0.00		
	5				
	6				
2	0	733.00		16.0	No response
	1	733.00	0.00		
	2	733.00	0.00		
	3	733.00	0.00		
	4	733.00	0.00		
	5				
	6				
	7				
3	0	733.50		30.0	No response
	1	733.50	0.00		
	2	733.50	0.00		
	3	733.50	0.00		
	4				
	5				
4	0	733.70		40.0	
	3	733.75	0.017		
	6	733.80	0.017		
	9	733.85	0.017		
	12	733.90	0.017		

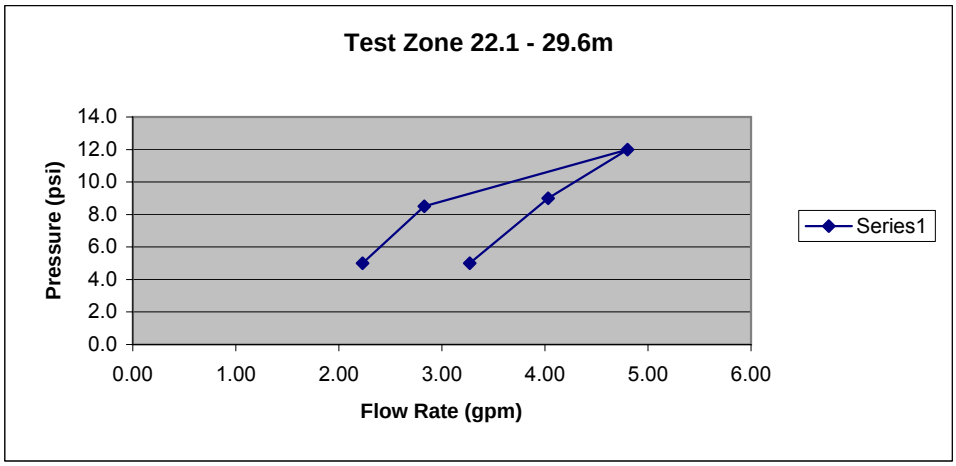
Summary	31.1	35.6
	Flow rate (gpm)	Pressure (psi)
	0.02	40.0

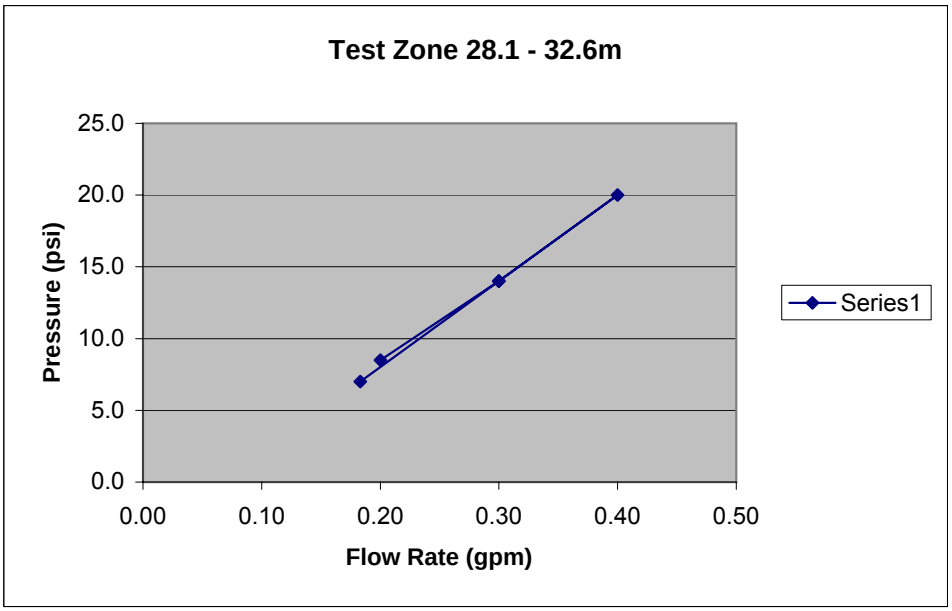
Test 5 34.1 38.6

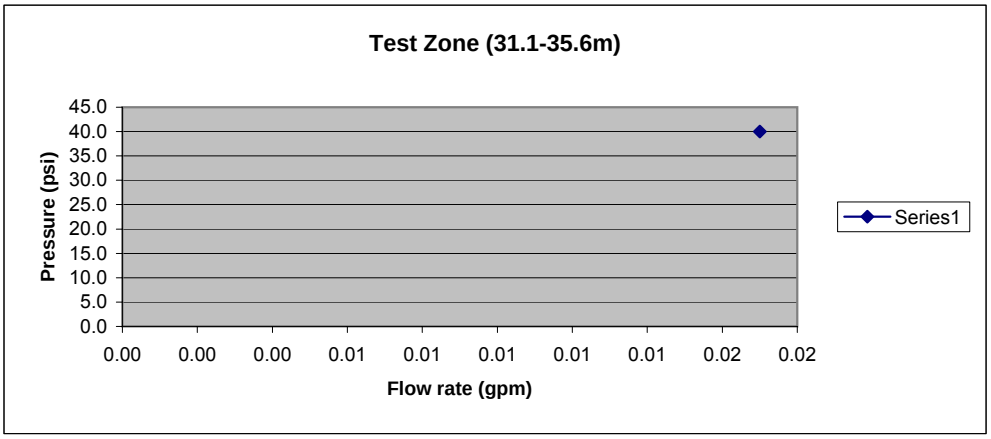
Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments
1	0	34.50		**12.0**	
	1	34.80	0.30		
	2	35.05	0.25		
	3	35.20	0.15		
	4	35.40	0.20		
	5	35.5	0.10		
	6	35.7	0.20		
	7	35.9	0.20		
	8	36.05	0.15		
	9	36.2	0.15		
	10	36.35	0.15	**0.15**	
2	0	36.80		**20.0**	
	1	37.10	0.30		
	2	37.40	0.30		
	3	37.60	0.20		
	4	37.80	0.20		
	5	37.95	0.15		
	6	38.20	0.25		
	7	38.40	0.20		
	8	38.65	0.25		
	9	38.85	0.20	**0.22**	
3	0	39.5		**30.0**	
	1	39.65	0.15		
	2	39.90	0.25		
	3	40.10	0.20		
	4	40.30	0.20		
	5	40.50	0.20	**0.20**	
4	0	40.60		**20.0**	
	1	40.75	0.15		
	2	40.80	0.05		
	3	40.95	0.15		
	4	41.10	0.15		
	5	41.25	0.15	**0.15**	
	6				
5	0	41.20		**12.0**	
	1	41.25	0.05		
	2	41.30	0.05		
	3	41.35	0.05	**0.05**	
	4				
	5		0.00		
	6		0.00		
	7		0.00		

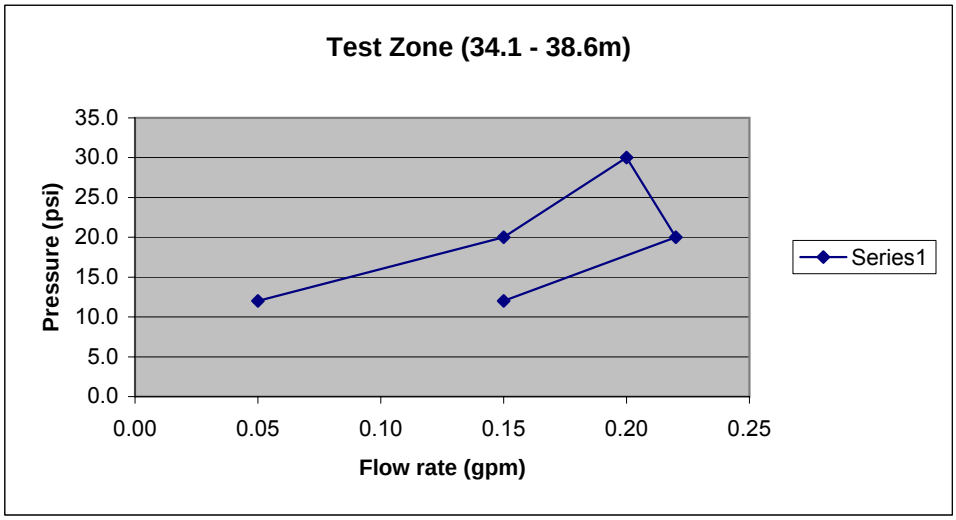
Summary	**34.1**	**38.6**
Flow rate (gpm)	Pressure (psi)	
0.15	12.0	
0.22	20.0	
0.20	30.0	
0.15	20.0	
0.05	12.0	


Test Zone (22.3-26.5m)
Pressure (psi)
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
0.00
0.05
0.10
0.15
0.20
Flow Rate (gpm)
Series1


Test Zone 22.1 - 29.6m
Pressure (psi)
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
0.00
1.00
2.00
3.00
4.00
5.00
6.00
Flow Rate (gpm)
Series1


Test Zone 28.1 - 32.6m
Pressure (psi)
25.0
20.0
15.0
10.0
5.0
0.0
0.00
0.10
0.20
0.30
0.40
0.50
Flow Rate (gpm)
Series1


Test Zone (31.1-35.6m)
Pressure (psi)
45.0
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
0.00
0.00
0.00
0.01
0.01
0.01
0.01
0.01
0.02
0.02
Flow rate (gpm)
Series1


Test Zone (34.1 - 38.6m)
Pressure (psi)
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
0.00
0.05
0.10
0.15
0.20
0.25
Flow rate (gpm)
Series1

Permeability Summary

MPV-04-167c

from	to		Step 1	Step 2	Step 3	Step 4	Step 5	Avg K
22.3	26.5	gauge (psi)	12	17				
		Qavg (igpm)	0.13	0.18				
		K cm/sec	2.0E-05	2.0E-05				2.0E-05
22.1	29.6	gauge (psi)	5	8.5	12	9	5	
		Qavg (igpm)	2.23	2.83	4.8	4.03	3.27	
		K cm/sec	4.7E-04	3.5E-04	4.2E-04	4.7E-04	6.9E-04	4.8E-04
28.1	32.6	gauge (psi)	7	14	20	14	8.5	
		Qavg (igpm)	0.18	0.3	0.4	0.3	0.2	
		K cm/sec	4.5E-05	3.8E-05	3.5E-05	3.8E-05	4.2E-05	4.0E-05
31.1	35.6	gauge (psi)	40					
		Qavg (igpm)	0.017					
		K cm/sec	7.5E-07					7.5E-07
34.1	38.6	gauge (psi)	12	20	30	20	12	
		Qavg (igpm)	0.15	0.22	0.2	0.15	0.05	
		K cm/sec	2.21E-05	1.94E-05	1.18E-05	1.32E-05	7.36E-06	1.5E-05
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	

Equations:

$Hf = 8.65x10^{-15} (Q^2 * Lp/rp^5)$

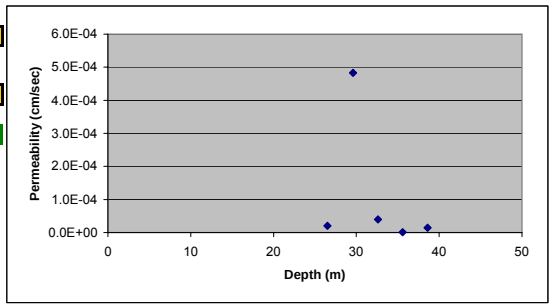
$H_{nit} = (Dw' + Hg - Hf) + Pg/1.42$

$K = (Q * Ln(R/r_b))/2*\pi*H_{nit}*L)$

Overall 1.1E-04

assume
- vertical drillhole
- water at ground surface
- height of gauge is at rig flr
- negligible friction losses

Dw	Measured depth of static water (1)	0	m
Dp	Measured depth to packer		m
Dt	Depth to midpoint of test		m
Inc	Inclination from horizontal	90	m
Dw'	Vertical depth to static water level		°
Dp'	Vertical depth to packer		m
Dt'	Vertical depth to midpoint of test		m
Hg	Gauge height	0	m
Lp	Length of discharge pipe		m
rp	Radius of discharge pipe (1" = 0.0127m)		m
R	Radius of influence (10m is standard)	10	m
rb	Drillhole radius (HQ=0.048m, NQ=0.038m)	0.038	m
L	Length of test section		m
Hf		0	m



Reflex Readings

MPV-04-167c

Date	
Hole Depth	
Azi/Dir	
Incl/dip	
Roll (Toolface re to Mag N)	
Magnetic Field	
Temp ©	

Not done for fear of instrument freezing

FIELD GEOLOGICAL LOG

HOLE ID **MPV-04-167c**

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.6	2.63	Ice/snow			MS
2.63	8.87	water			MS
8.87	17.8	Overburden			RB
17.80	25.6	GRN		Granite ranging from predominantly grey biotite-rich to pink pegmatitic to light green sericitic. Highly variable joint angles with frequent carbonate coatings.	RB
25.6	32.6	NGRN		Gneissic granite: biotite rich, dark grey; compact; joint often filled with calcite. granite is medium grained. Some ;large grained pegmatic sections.	MS
32.6	35.6	GRN		Granite ranging from predominantly biotite-rich salt and pepper to pegmatitic pink.	MS

UCS SAMPLES

HOLE ID: MPV-04-167C

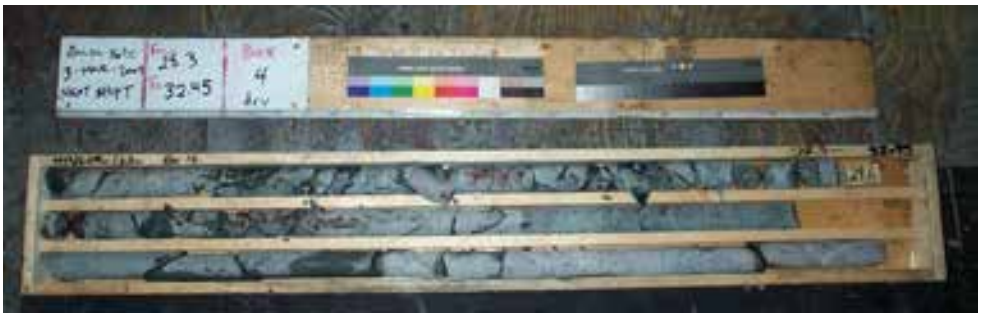
HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-167C	6	38.09	Granite	04-UCS-167-001

POINT LOAD TEST - INPUT

DRILL HOLE ID: MPV-04-167C

No. #	Tested by	DATE	HOLE/ FACE ID	DIST. (m)	ROCK TYPE	TEST TYPE	ORINT	DAYS	W (mm)	D (mm)	P (kN)	COMMENT
	BAM	04/06/2004	MPV-04-167C	38.00	GRANITE	1	LEFT			47.20	1550.00	GOOD BREAK
	BAM	04/06/2004	MPV-04-167C	38.00	GRANITE	1	LEFT			47.20	2200.00	GOOD BREAK
	BAM	04/06/2004	MPV-04-167C	38.00	GRANITE	1	LEFT			47.20	1650.00	FAIR BREAK
	BAM	04/06/2004	MPV-04-167C	38.00	GRANITE	1	RIGHT			47.20	1350.00	GOOD BREAK
	BAM	04/06/2004	MPV-04-167C	38.00	GRANITE	1	RIGHT			47.20	1650.00	GOOD BREAK

MPV_04_167C



Diary

MPV-04-169c

target is 50m into bedrock with 3 packer tests, approx 10m each, between 20m and 50m into bedrock

DS 14/03/2004

1230	moving from MPV-04-166c
1530	drilled ice to access circulation water
	Key depths (rig floor = 0.0m) …are
	0.6m to ice
	2.4m to water
	3.0m to lake bed
	8.0m to bedrock
	casing set to 9.2m (9m + 02.m below rig flr)
1800	rods to 8.8m (4+3+3 - 1.2 stick-up)
1830	rods at 11.8 - not pulled

NS 14/03/2004

1100hrs	at 23m
0040hrs	set up for packer test at 38.8 (pull four rods).
0150hrs	Packer test completed. Reinsert rods.
0415hrs	Drill bit finished. Drillers install new drill bit.
0700	at 50.8m

NS 15/03/2004

0830	finished packer test at 40.3 - 50.8m
0930	at 53.8
1015	at 56.8
1130	reflex test
1300	finished packer test at 49.3 - 59.8m
	grouted
	staked

SRK Consulting
Engineers and Scientists

FIELD DRILL PERFORMANCE LOG

PROJECT	**Gahcho Kue Geotech**
PROJECT NO	**2CD002.11**
NORTHING	
EASTING	
SURFACE ELEVATION	
AZIMUTH	-
DIP	90

HOLE NO:	**MPV-04-169c**
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	1500hrs March 14, 2004
FINISH DATE AND TIME	18:30hrs March 15, 2004
HOLE DIAMETER	47.6 (NQ)
DRILLING METHOD	Diamond core

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
DS 0700-1900	R Bowden	03/14/2004	1800	12	4	11.8	moving	11.8	8	1.48	12	4	8	1.48
NS 1900-0700	M Storey	03/14/2004	0700	12	2	50.80	Packer testing, change drill bit.	39	10	3.90	24	6	18	2.82
DS 0700-1900	R Bowden	03/15/2004	1830	12	7.5	59.80	2 Packer tests + move off	9	4.5	2.00	36	13.5	22.5	2.66

OVERALL HOLE DRILL RATE (m/hr)	1.66
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	2.66

GENERAL GEOTECH LOG

DRILLHOLE ID: **MPV-04-169c**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
		0.00								
		0.00								
8.00	8.80	0.80	GRN	0.80	100.0	0.80	100.0	0.80	100.0	
8.80	11.80	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	Some mechanical breakage. One break along longitudinal axis.
11.80	14.80	3.00	GRN	2.74	91.3	2.74	91.3	2.74	91.3	
14.80	17.80	3.00	GRN	2.93	97.7	2.93	97.7	2.93	97.7	
17.80	20.80	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
20.80	23.80	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
23.80	26.80	3.00	GRN	2.98	99.3	2.98	99.3	2.78	92.7	
26.80	29.80	3.00	GRN	2.97	99.0	2.97	99.0	2.75	91.7	
29.80	32.80	3.00	GRN	3.00	100.0	2.97	99.0	2.86	95.3	
32.80	35.80	3.00	GRN	2.80	93.3	2.80	93.3	2.80	93.3	
35.80	38.80	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
38.80	41.80	3.00	GRN	2.83	94.3	2.83	94.3	2.83	94.3	
41.80	44.80	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
44.80	47.80	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
47.80	50.80	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
50.80	53.80	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
53.80	56.80	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
56.80	59.80	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	**EOH**

DETAILED GEOTECHNICAL LOG

DRILLHOLE ID: **MPV-04-169c**

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handli
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

FROM	TO	ROCK	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of			JOINT CONDITIONS				COMMENT
(m)	(m)	TYPE	STRONG R	WEAK R	% WEAK	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH	Sets	Type	Totals	ANGLE	ROUGH	ALT	FILL	
8.0	8.8	GRN	R4			4		0	0		0	0								
8.8	11.8	GRN	R6			18		2	0		0	0	2	J1	1	70	5	0	3	
														J2	1	80	5	0	6	
11.8	14.8	GRN	R5			15		1	0		0	0	1	J1	1	80	3	0	1	
14.8	17.8	GRN	R6			14		5	0		0	0	2	J1	2	55	5	0	3	J2 angles (12) 60; (1) 25.
														J2	3	60	4	0	3	
17.8	20.8	GRN	R4			14		1	0		0	0	1	J1	1	75	5	0	3	
20.8	23.8	GRN	R5			10		2	0		0	0	2	J1	1	65	5	0	3	
														J2	1	65	5	0	9	
23.8	26.8	GRN	R4			14		4	0		0	0	2	J1	3	60	5	0	3	J1 angles: 70, 60, 45.
														J2	1	60	4	0	3	
26.8	29.8	GRN	R5			13		6	0		1	0	2	J1	4	80	4	0	1	J1 angles: (2) 80, 70, 50. J2 angles: 60, 65.
														J2	2	65	5	0	3	
29.8	32.8	GRN	R4			13		6	0		0			J1	1	45	7	0	9	J3 angles: 45, 75, 80. Joint set 4: 85 degrees; rough: 5; alt:0; fill: 6.
														J2	1	45	7	0	3	
														J3	3	75	5	0	3	
32.8	35.8	GRN	R5			11		2	0		1	0	1	J1	1	60	5	0	3	
														J2	1	50	5	0	3	
35.8	38.8	GRN	R6			12		0	0		0									Mechanical breaks only.
38.8	41.8	GRN	R6			9		2	0		0		2	J1	1	85	5	0	3	
														J2	1	50	4	0	3	
41.8	44.8	GRN	R6			8		0	0		0									Mechanical breaks only.
44.8	47.8	GRN	R5			11		2	0		0		2	J1	1	65	5	0	3	
														J2	1	85	5	0	3	
47.8	50.8	GRN	R4			15		2	1	0	1	0	1	J1	2	75	5	0	3	J1 angles: 75, 65.
50.8	53.8	GRN	R6			5		2	0		0		2	J1	1	77	7	0	3	J1 has slight carbonate residue
														J2	1	7	5	0	9	
53.8	56.8	GRN	R6			11		2	0		0		1	J1	1	30	4	0	3	J1 has partial carbonate coating
56.8	59.8	GRN	R6			11		6	0		0		3	J1	2	77	7	0	3	J1 has one joint with continuous carbonate coating, and ahngles of 70 and 77; J2 has one joint with partial carbonate coating; J3 has angles of 25/40/47, roughness of 5/5/2
														J2	2	75	5	0	3	
														J3	3			0	3	
EOH																				EOH

Photo Record

MPV-04-169c

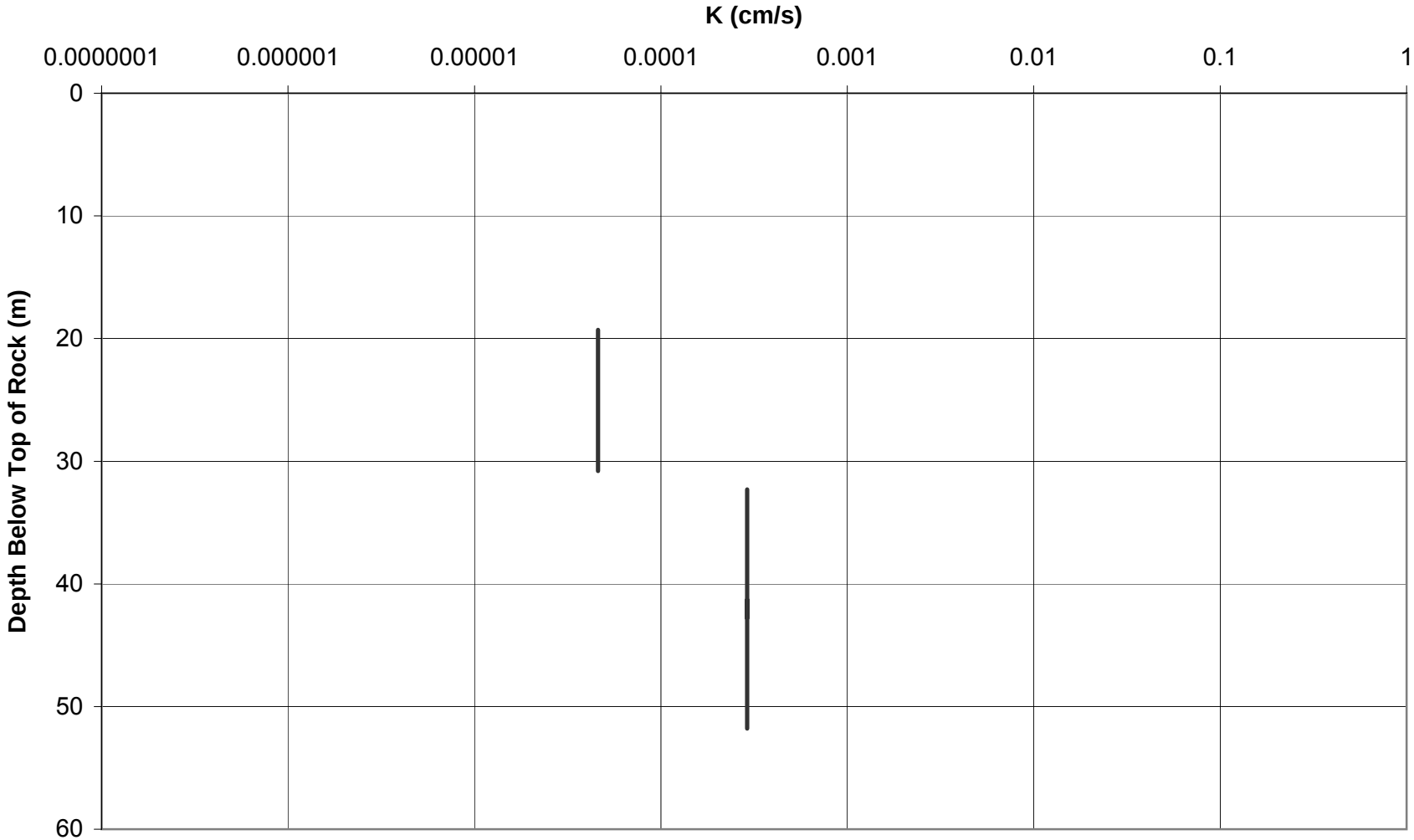
Date	Shift	Filename	Depth	Description
03/14/2004	NS 1900-0700	MPV-04-169C-8m_box1-dry	8 - 11.48m	GRN
03/14/2004	NS 1900-0700	MPV-04-169C-11.8m_box2-dry	11.48 - 16.48m	GRN
03/14/2004	NS 1900-0700	MPV-04-169C-16.48m_box3-dry	16.48 - 20.8 m	GRN
03/14/2004	NS 1900-0700	MPV-04-169C-20.8m_box4-dry	20.8 - 24.86m	GRN
03/14/2004	NS 1900-0700	MPV-04-169C-24.86m_box5-dry	24.86 - 29.24m	GRN
03/14/2004	NS 1900-0700	MPV-04-169C-29.24m_box6-dry	29.24 - 33.5m	GRN
03/14/2004	NS 1900-0700	MPV-04-169C-33.5m_box7-dry	33.5 - 38.1m	GRN
03/14/2004	NS 1900-0700	MPV-04-169C-38.1m_box8-dry	38.1 - 42.24m	GRN
03/14/2004	NS 1900-0700	MPV-04-169C-42.24m_box9-dry	42.24 - 46.75m	GRN
03/14/2004	NS 1900-0700	MPV-04-169C-46.75m_box10-dry	46.75 - 50.8m	GRN
03/15/2004	DS 0700-1900	MPV-04-169C-50.8m_box11-wet	50.8 - 55.2m	GRN
03/15/2004	DS 0700-1900	MPV-04-169C-55.1m_box12-dry	55.2 - 59.2m	GRN
03/15/2004	DS 0700-1900	MPV-04-169C-59.2m_box13-dry	59.2 - 59.8m	GRN

Core Box Record

MPV-04-169c

Box	From	To	Comments
1	8.00	11.48	
2	11.48	16.48	
3	16.48	20.80	
4	20.80	24.86	
5	24.86	29.24	
6	29.24	33.50	
7	33.50	38.10	
8	38.10	42.44	
9	42.44	46.75	
10	46.75	50.80	
11	50.80	55.10	
12	55.10	59.20	
13	59.20	59.80	
E.O.H.			

Permeability vs Depth
MPV_04_169C



Packer Test Data

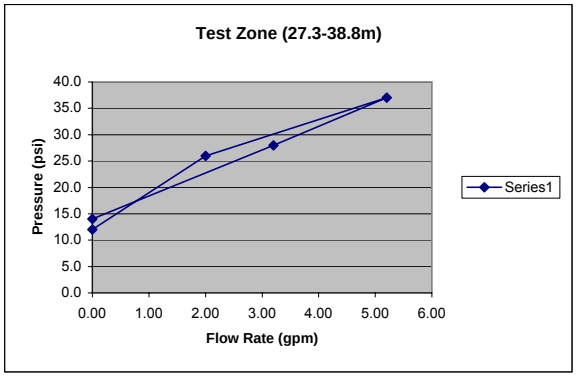
Date	22-Feb-04
Staff	
Init. WL:	0
Ref. Pt.	drill shack floor
Dip	90

MPV-04-169c

Test 1 27.3 38.8

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments
1	0	758.60		12.0	**no leaks**
	1	758.80	0.20		
	2	758.80	0.00		
	3	758.80	0.00		
	4	758.80	0.00		
	5	758.80	0.00	**0.0**	
2	0	764.00		26.0	**no leaks**
	1	767.30	3.30		
	2	769.40	2.10		
	3	771.30	1.90		
	4	773.40	2.10		
	5	775.30	1.90		
				2.0	
3	0	784.50		37.0	**no leaks**
	1	789.60	5.10		
	2	795.00	5.40		
	3	800.20	5.20		
	4	805.50	5.30		
	5	810.7	5.20	**5.2**	
4	0	812.50		28.0	**no leaks**
	1	816.00	3.50		
	2	819.30	3.30		
	3	822.50	3.20		
	4	825.70	3.20		
	5				
	6			**3.2**	
5	0	818.10		14.0	**no leaks**
	1	818.10	0.00		
	2	818.10	0.00		
	3	818.10	0.00		
	4	818.10	0.00		
	5				
	6		0.00		
	7		0.00		
	8		0.00	**0.0**	

Summary	27.3	38.8
	Flow rate (gpm)	Pressure (psi)
	0.00	12.0
	2.00	26.0
	5.20	37.0
	3.20	28.0
	0.00	14.0

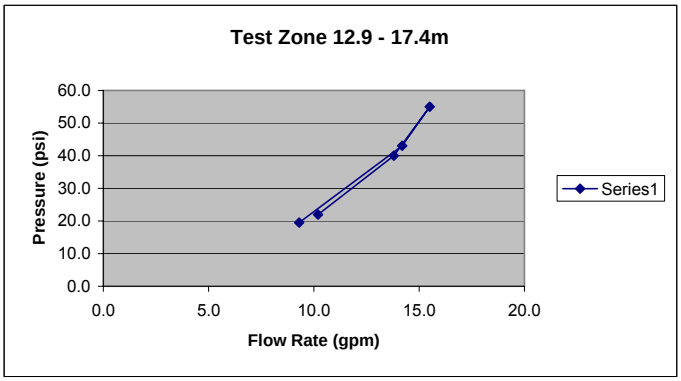


Test 2 40.3 50.8

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments
1	0	820.80		22.0	
	1	830.80	830.80		
	2	841.00	10.20		
	3	851.20	10.20		
	4	861.40	10.20	**10.2**	
	5				
	6				
2	0	944.30		40.0	
	1	957.80	13.50		
	2	971.60	13.80		
	3	985.30	13.70		
	3	999.20	13.90		
	4	1012.90	13.70	**13.8**	
3	0	1027.60		55.0	
	1	1043.40	15.80		
	2	1058.80	15.40		
	3	1074.40	15.60		
	4	1090.00	15.60	**15.5**	
4	0	1104.40		43.0	
	1	1118.50	14.10		
	2	1132.70	14.20		
	3	1146.80	14.10		
	4	1161.00	14.20	**14.2**	
5	0	1171.50		19.5	
	1	1180.70	9.20		
	2	1189.80	9.10		
	3	1199.10	9.30		
	4	1208.40	9.30		
	5	1217.70	9.30	**9.3**	

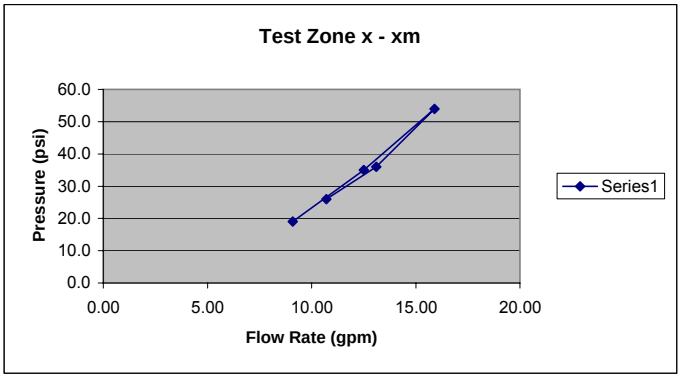
Summary **40.3** **50.8**

Flow rate (gpm)	Pressure (psi)
10.2	22.0
13.8	40.0
15.5	55.0
14.2	43.0
9.3	19.5



Test 3		49.3	59.8		
Step	**Elapsed time (min)**	**Flow (gal)**	**Flow rate (gpm)**	**Gauge pres (psi)**	**Comments**
1	0	224.50		**26.0**	
	1	235.10	10.60		
	2	245.70	10.60		
	3	256.40	10.70		
	4	267.10	10.70	**10.7**	
2	0	279.80		**36.0**	
	1	293.00	13.20		
	2	306.00	13.00		
	3	319.10	13.10		
	3	332.20	13.10	**13.1**	
3	0	371.50		**54.0**	
	1	387.20	15.70		
	2	403.40	16.20		
	3	419.20	15.80		
	4	435.10	15.90		
	5	451	15.90	**15.9**	
4	0	463.90		**35.0**	
	1	476.40	12.50		
	2	488.90	12.50		
	3	501.40	12.50	**12.5**	
5	0	510.80		**19.0**	
	1	519.80	9.00		
	2	528.80	9.00		
	3	537.90	9.10		
	4	547.00	9.10	**9.1**	

Summary	**49.3**	**59.8**
Flow rate (gpm)	Pressure (psi)	
10.70	26.0	
13.10	36.0	
15.90	54.0	
12.50	35.0	
9.10	19.0	



Permeability Summary

MPV-04-169c

from	to		Step 1	Step 2	Step 3	Step 4	Step 5	Avg K
27.3	38.8	gauge (psi)	12	26	37	28	14	
		Qavg (igpm)	0	2	5.2	3.2	0	
		K cm/sec	0.0E+00	5.3E-05	9.7E-05	7.9E-05	0.0E+00	4.6E-05
40.3	50.8	gauge (psi)	22	40	55	43	19.5	
		Qavg (igpm)	10.2	13.8	15.5	14.2	9.3	
		K cm/sec	3.5E-04	2.6E-04	2.1E-04	2.5E-04	3.6E-04	2.9E-04
49.3	59.8	gauge (psi)	26	36	54	35	19	
		Qavg (igpm)	10.7	13.1	15.9	12.5	9.1	
		K cm/sec	3.1E-04	2.8E-04	2.2E-04	2.7E-04	3.6E-04	2.9E-04
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

Overall #DIV/0!

Equations:

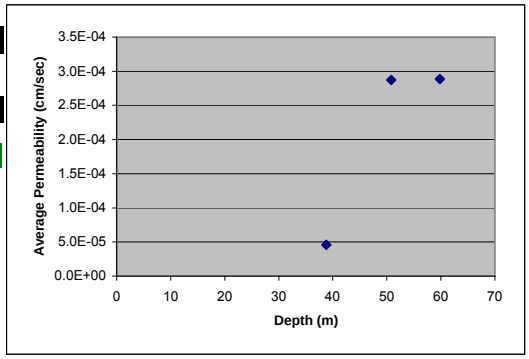
$Hf = 8.65x10^{-15} (Q^2 * Lp/rp^5)$

$H_{nit} = (Dw' + Hg - Hf) + Pg/1.42$

$K = (Q * Ln(R/r_b))/2 * \pi * H_{nit} * L)$

assume
- vertical drillhole
- water at ground surface
- height of gauge is at rig flr
- negligible friction losses

Dw	Measured depth of static water (1)	0	m
Dp	Measured depth to packer		m
Dt	Depth to midpoint of test		m
Inc	Inclination from horizontal	90	m
Dw'	Vertical depth to static water level		°
Dp'	Vertical depth to packer		m
Dt'	Vertical depth to midpoint of test		m
Hg	Gauge height	0	m
Lp	Length of discharge pipe		m
rp	Radius of discharge pipe (1" = 0.0127m)		m
R	Radius of influence (10m is standard)	10	m
rb	Drillhole radius (HQ=0.048m, NQ=0.038m)	0.038	m
L	Length of test section		m
Hf		0	m



Reflex Readings

MPV-04-169c

Date	Mar 15-2004
Hole Depth	59.8
Azi/Dir	163.2
Incl/dip	-88.8
Roll (Toolface re to Mag N)	117.8
Magnetic Field	5977
Temp ©	6.2

FIELD GEOLOGICAL LOG

HOLE ID **MPV-04-169c**

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.60	2.40			Ice	MS
2.4	3			water	MS
3.00	8.00	OVBN		Overburden	MS
8.00	59.80	GRN		Granite: Biotite rich, pinkish-grey, medium grained with some pegmatitic sections, some quartz veins, hematite/chlorite staining observed at most joints, compact, fresh granite	MS

UCS SAMPLES

HOLE ID: MPV-04-169C

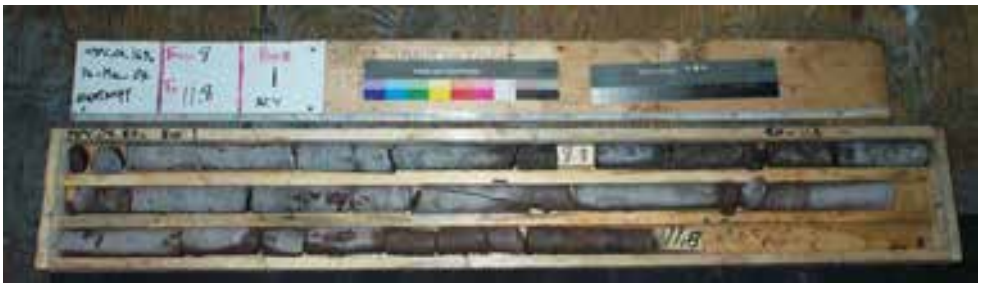
HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-169C	10	47.48-47.80	GRANITE	04-UCS-169-001

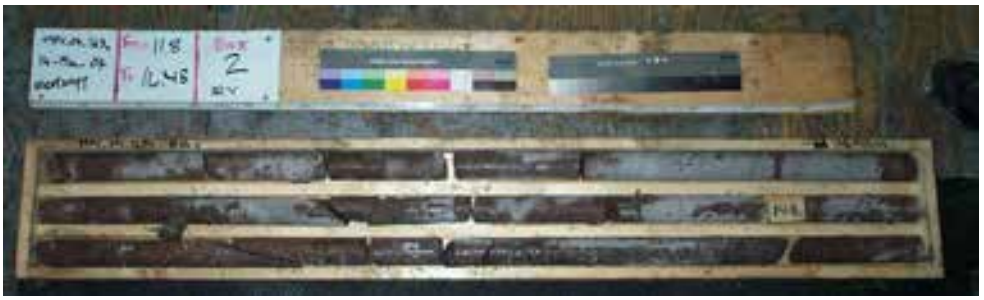
POINT LOAD TEST - INPUT

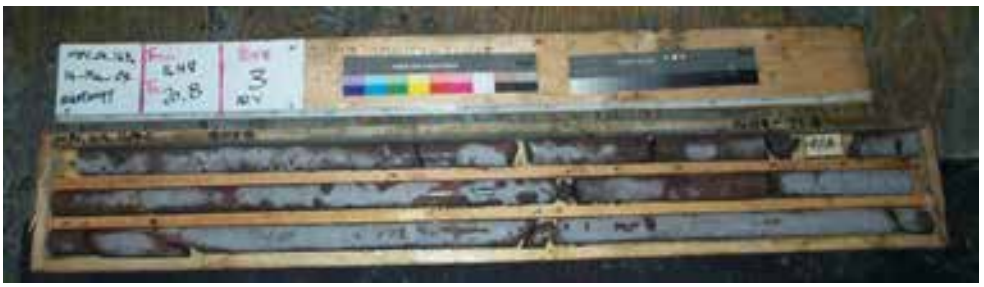
DRILL HOLE ID: MPV-04-169C

No. #	Tested by	DATE	HOLE/ FACE ID	DIST. (m)	ROCK TYPE	TEST TYPE	ORINT	DAYS	W (mm)	D (mm)	P (kN)	COMMENT
	BAM	04/06/2004	MPV-04-169C	47.30	GRANITE	1	LEFT			47.45	2300.00	GOOD BREAK
	BAM	04/06/2004	MPV-04-169C	47.30	GRANITE	1	LEFT			47.45	1850.00	GOOD BREAK
	BAM	04/06/2004	MPV-04-169C	47.30	GRANITE	1	LEFT			47.45	1700.00	GOOD BREAK
	BAM	04/06/2004	MPV-04-169C	47.89	GRANITE	1	RIGHT			47.19	1950.00	GOOD BREAK
	BAM	04/06/2004	MPV-04-169C	47.89	GRANITE	1	RIGHT			47.19	1850.00	POOR BREAK
	BAM	04/06/2004	MPV-04-169C	47.89	GRANITE	1	RIGHT			47.19	1850.00	GOOD BREAK

MPV_04_169C

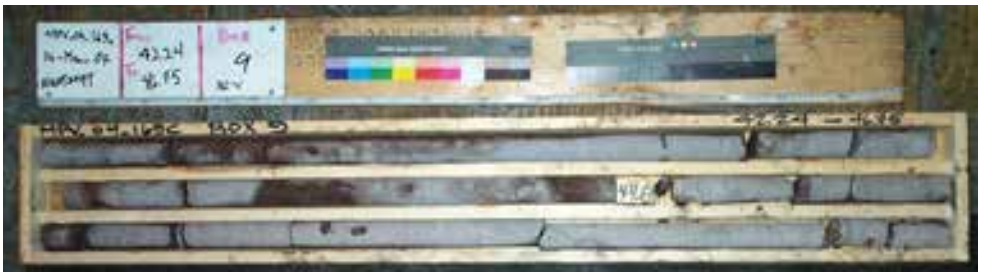


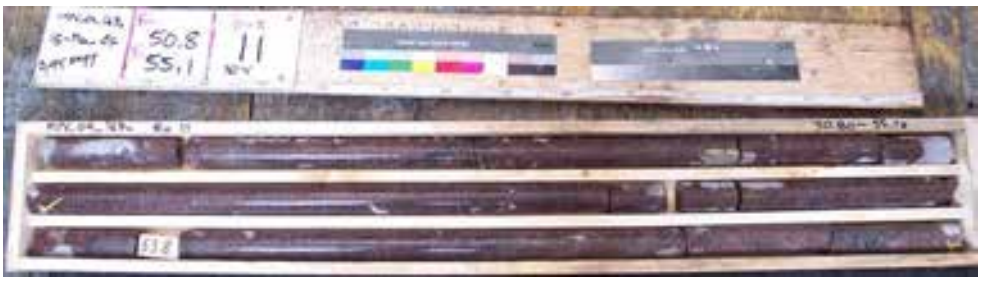




MPV_04_169C

MPV_04_169C





Diary

MPV-04-170c

NS 15/03/2004	D2-GB-extra (adjacent to D2-GB-5) approx 1 South along axis of dyke
	target is 50m into bedrock with 3 packer tests, approx 10m each, between 20m and 50m into bedrock
	drilled ice to access circulation water
1930hrs	install casing
	Key depths (rig floor = 0.0m) …are
	0.6m to ice
	2.0m to water
	3.2m to lake bed
	4.3m to bedrock
2130hrs	Bottom of casing at 5.3m
0030hrs	drill bit finished at 18m. Driller left to get new bit.
0100hrs	drilling resumes
0330hrs	at 33m
0400hrs	set up for packer test at 36m.
0500hrs	packer test completed.
DS 16/03/2004	
740	at 39m
1030	at 50m
	changed bit at 49.4m
1200hrs	at 52
1230hrs	at 54 END OF HOLE
1245hrs	pulled rods for packer testing
1430hrs	started grouting hole

SRK Consulting
Engineers and Scientists

FIELD DRILL PERFORMANCE LOG

PROJECT	**Gahcho Kue Geotech**
PROJECT NO	**2CD002.11**
NORTHING	approx 1m south of D2-GB-5
EASTING	
SURFACE ELEVATION	
AZIMUTH	-
DIP	90

HOLE NO:	**MPV-04-170c**
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	1900hrs March 15, 2004
FINISH DATE AND TIME	1230hrs March 16, 2004
HOLE DIAMETER	47.6 (NQ)
DRILLING METHOD	Diamond core

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
NS 1900-0700	M Storey	03/15/2004		12	2	36	Set casing, change drill bit.	36	10	3.60	12	2	10	3.60
DS 0700-1900	R Bowden	03/15/2004		12	6.5	54.00	packer testing and move off of hole	18	5.5	3.27	24	8.5	15.5	3.48

OVERALL HOLE DRILL RATE (m/hr)	2.25
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	3.48

GENERAL GEOTECH LOG

DRILLHOLE ID: **MPV-04-170c**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
		0.00								
5.20	6.00	0.80	BGRN	0.80	100.0	0.77	96.3	0.77	96.3	Rock fragments (mechincal breaks).
6.00	9.00	3.00	BGRN	3.00	100.0	2.95	98.3	2.95	98.3	
9.00	12.00	3.00	BGRN	3.00	100.0	3.00	100.0	3.00	100.0	
12.00	15.00	3.00	BGRN	3.00	100.0	3.00	100.0	3.00	100.0	
15.00	18.00	3.00	BGRN	3.00	100.0	3.00	100.0	3.00	100.0	
18.00	21.00	3.00	BGRN	3.00	100.0	2.97	99.0	2.75	91.7	
21.00	24.00	3.00	BGRN	2.98	99.3	2.88	96.0	2.88	96.0	
24.00	27.00	3.00	BGRN	3.00	100.0	3.00	100.0	3.00	100.0	
27.00	30.00	3.00	BGRN	3.00	100.0	3.00	100.0	3.00	100.0	
30.00	33.00	3.00	BGRN	3.00	100.0	3.00	100.0	3.00	100.0	Pegmatite section 32 - 32.6m
33.00	36.00	3.00	BGRN	3.00	100.0	3.00	100.0	3.00	100.0	
36.00	39.00	3.00	BGRN	3.00	100.0	3.00	100.0	3.00	100.0	
39.00	42.00	3.00	BGRN	3.00	100.0	3.00	100.0	3.00	100.0	
42.00	45.00	3.00	BGRN	3.00	100.0	3.00	100.0	3.00	100.0	
45.00	48.00	3.00	BGRN	3.00	100.0	3.00	100.0	3.00	100.0	
48.00	49.40	1.40	BGRN	1.40	100.0	1.36	97.1	1.19	85.0	
49.40	51.00	1.60	BGRN	1.60	100.0	1.60	100.0	1.60	100.0	
51.00	54.00	3.00	BGRN	3.00	100.0	3.00	100.0	3.00	100.0	**END OF HOLE**

DETAILED GEOTECHNICAL LOG

DRILLHOLE ID: **MPV-04-170c**

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificia
Note any weak foliation, bedding, brecciation in comments

FROM	TO	ROCK	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of			JOINT CONDITIONS				COMMENT
(m)	(m)	TYPE	STRONG R	WEAK R	% WEAK	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH	Sets	Type	Totals	ANGLE	ROUGH	ALT	FILL	
6.0	9.0	**BGRN**	R6			25		2	0	0	0		2	J1	1	35	8	0	3	
														J2	1	65	5	0	3	
9.0	12.0	**BGRN**	R6			21		5	0	0	0		3	J1	2	75	5	0	3	J1 angles: 75, 65
														J2	1	35	4	0	3	
														J3	2	85	4	0	3	
12.0	15.0	**BGRN**	R4			26		3	0	0	1	0	2	J1	2	40	4	0	3	J1 angles 30, 40. Calcite coating on all joints.
														J2	1	85	5	0	3	
15.0	18.0	**BGRN**	R6			22		7	0	0	1	0	2	J1	6	75	5	0	3	J1 angles (4) 75, 55,30;
														J2	1	45	5	0	6	
18.0	21.0	**BGRN**	R5			28		8	1	0	1	0	3	J1	3	35	5	0	3	
														J2	4	75	5	0	3	
														J3	1	40	2	0	3	
21.0	24.0	**BGRN**	R4			22		7	1	0	1	0	3	J1	1	50	5	0	3	J2 angles: 35; 40; 45; (2)80
														J2	5	45	4	0	3	
														J3	1	30	2	0	3	
24.0	27.0	**BGRN**	R3			26		2	0	0	2	0	1	J1	2	85	5	0	3	
27.0	30.0	**BGRN**	R4			24		1	1	0	1	0	1	J1	1	50	5	0	3	
30.0	33.0	**BGRN**	R4			24		2	1	0	1	0	1	J1	2	75	4	0	3	
33.0	36.0	**BGRN**	R4			22		0	0		1	0								Mechanical fractures only.
36.0	39.0	**BGRN**	R5			22		1	0		1	0	1	J1	1	72	5	0	3	slight carbonate coating
39.0	42.0	**BGRN**	R5			22		3	0		0		2	J1	2	32	7	0	3	J1 has one joint with carbonate coating; J2 is coated
														J2	1	84	5	0	3	
42.0	45.0	**BGRN**	R5			18		4	0		0		3	J1	1	80	4	0	3	
														J2	1	34	4	0	3	
														J3	1	72	5	0	3	
4.0	48.0	**BGRN**	R5			18		2	0		0		2	J1	1	35	5	0	3	J1 and J2 have carbonate coating
														J2	1	75	5	0	3	
48.0	49.4	**BGRN**	R5			9		4	0		0		2	J1	3	85	5	0	3	J1 has angles at 88 (2) and 84 with two joints with carbonate coating
														J2	1	30	5	0	3	
49.4	51.0	**BGRN**	R5			9		1	0		0		1	J1	1	30	5	0	3	
51.0	54.0	**BGRN**	R5			24		3	0		0		3	J1	2	80	4	0	3	J1 has angles of 74 and 80, both joints with carbonate copatings**END OF HOLE**
														J2	1	5	7	0	3	

Photo Record

MPV-04-170c

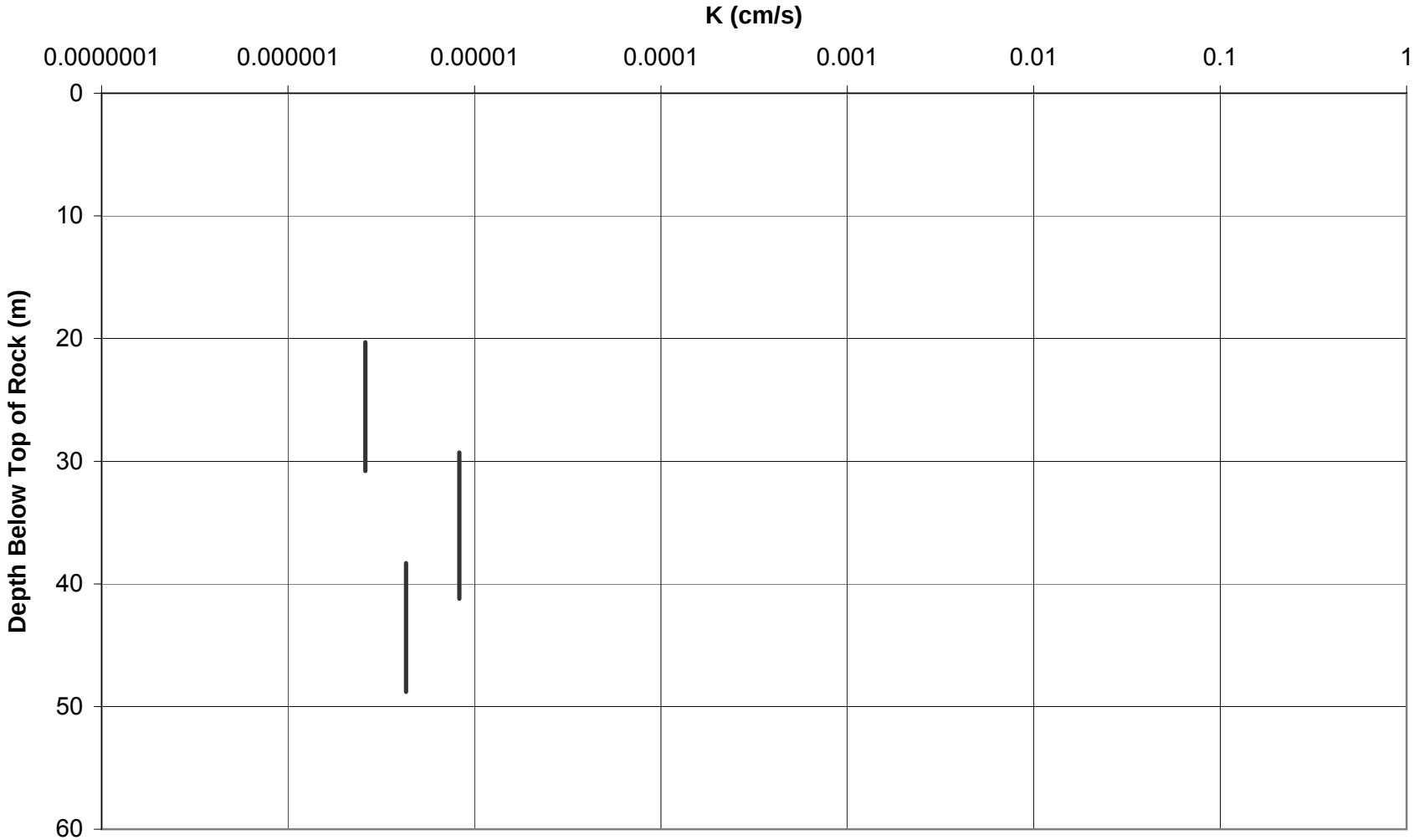
Date	Shift	Filename	Depth	Description
03/15/2004	NS 1900-0700	MPV-04-170C-5.2m_box1-dry	5.2 - 9m	
03/15/2004	NS 1900-0700	MPV-04-170C-9m_box2-wet	9 - 13.2m	
03/15/2004	NS 1900-0700	MPV-04-170C-9m_box3-dry	13.2 - 17.15m	
03/15/2004	NS 1900-0700	MPV-04-170C-21m_box4-dry	17.15 -21m	
03/15/2004	NS 1900-0700	MPV-04-170C-21m_box5-dry	21 - 25.2m	
03/15/2004	NS 1900-0700	MPV-04-170C-25.92m_box6-wet	25.2 - 29.25m	
03/15/2004	NS 1900-0700	MPV-04-170C-29.25m_box7-wet	29.25 - 33m	
03/16/2004	DS 0700-1900	MPV-04-170C-33.0m_box8-dry	33.00 - 37.08	
03/16/2004	DS 0700-1900	MPV-04-170C-37.08m_box9-dry	37.08 - 41.08	
03/16/2004	DS 0700-1900	MPV-04-170C-41.08m_box10-dry	41.08-45.27	
03/16/2004	DS 0700-1900	MPV-04-170C-4.27m_box11-dry	45.27 - 49.50m	
03/16/2004	DS 0700-1900	MPV-04-170C-49.5m_box12-dry	49.50 - 53.80m	
03/16/2004	DS 0700-1900	MPV-04-170C-49.5m_box13-dry	53.80 - 54.00m	

Core Box Record

MPV-04-170c

Box	From	To	Comments
1	5.20	9.00	
2	9.00	13.20	
3	13.20	17.15	
4	17.15	21.00	
5	21.00	25.20	
6	25.20	29.25	
7	29.25	33.00	
8	33.00	37.08	
9	37.08	41.08	
10	41.08	45.27	
11	45.27	49.50	
12	49.50	53.80	
13	53.80	**54.00**	**End of hole**

Permeability vs Depth
MPV_04_170C



Packer Test Data

Date	15-Mar-04
Staff	
Init. WL:	0
Ref. Pt.	drill shack floor
Dip	90

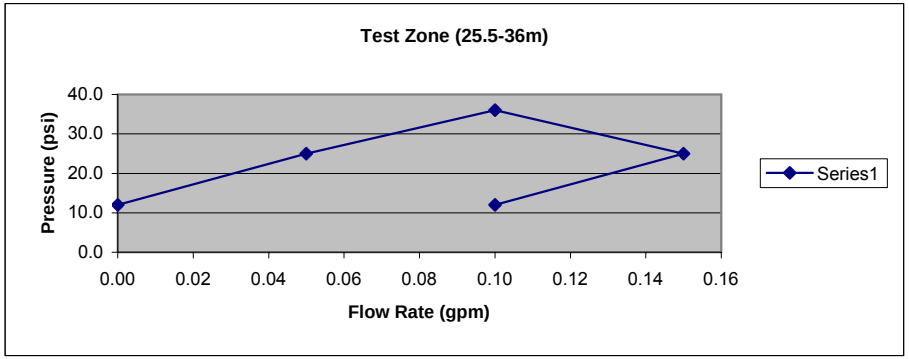
MPV-04-170c

Test 1 25.5 36

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments
1	0	7551.40		12.0	**no leaks**
	1	7551.60	0.20		
	2	7551.70	0.10		
	3	7551.80	0.10		
	4	7551.80	0.00		
	5	7551.90	0.10		
	6	7552.00	0.10		
	7	7552.10	0.10	**0.10**	
2	0	7552.50		25.0	**no leaks**
	1	7552.65	0.15		
	2	7552.80	0.15		
	3	7552.95	0.15		
	4	7553.10	0.15	**0.15**	
3	0	7553.30		36.0	**no leaks**
	1	7553.50	0.20		
	2	7553.60	0.10		
	3	7553.70	0.10		
	4	7553.80	0.10	**0.10**	
4	0	7553.85		25.0	**no leaks**
	1	7553.90	0.05		
	2	7553.95	0.05		
	3	7554.00	0.05		
	4	7554.05	0.05	**0.05**	
5	0	7554.05		13.0	**no leaks**
	1	7554.05	0.00		
	2	7554.05	0.00		
	3	7554.05	0.00		
	4	7554.05	0.00	**0.00**	

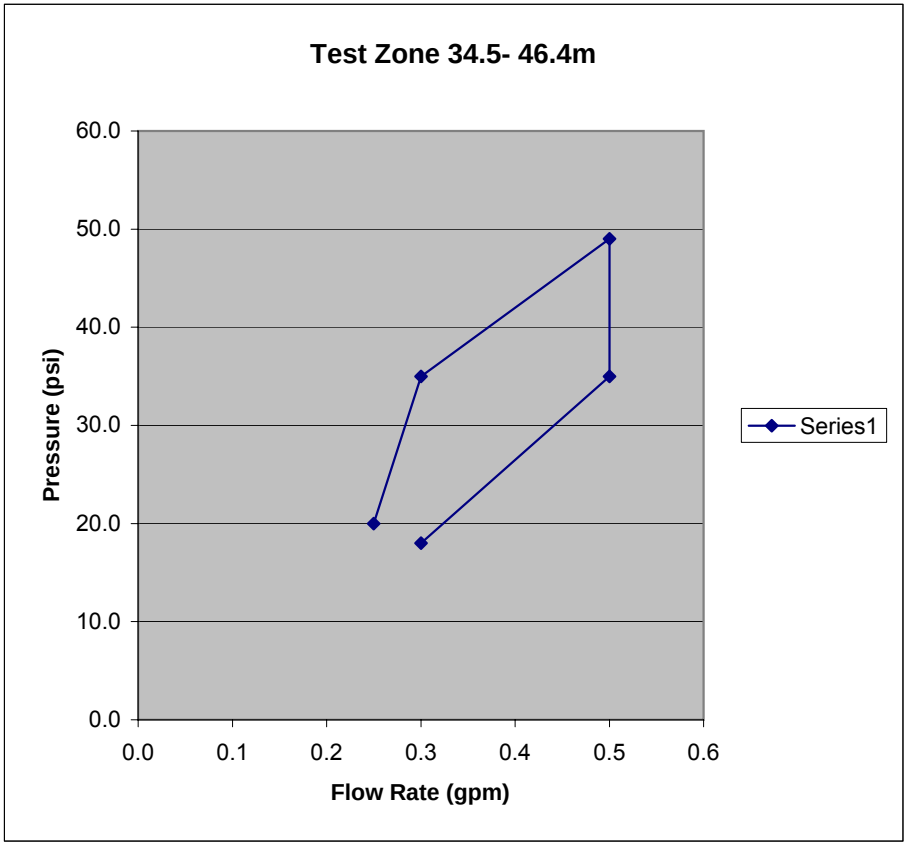
Summary 25.5 36

Flow rate (gpm)	Pressure (psi)
0.10	12.0
0.15	25.0
0.10	36.0
0.05	25.0
0.00	12.0



Test 2		34.5	46.4		
Step	**Elapsed time (min)**	**Flow (gal)**	**Flow rate (gpm)**	**Gauge press (psi)**	**Comments**
1	9:02	556.40		18.0	
	1	556.90	0.50		
	2	557.45	0.55		
	3	557.95	0.50		
	4	558.40	0.45		
	5	558.80	0.40		
	6	559.15	0.35		
	7	559.40	0.25		
	8	559.70	0.30		
	9	560.00	0.30	**0.3**	
2	9:12	560.95		35.0	
	1	561.70	0.75		
	2	562.35	0.65		
	3	563.00	0.65		
	4	563.45	0.45		
	5	564.00	0.55		
	6	564.40	0.40		
	7	565.00	0.60		
	8	565.50	0.50		
	9	566.00	0.50		
	10	566.50	0.50	**0.5**	
3	9:23	567.60		49.0	
	1	568.35	0.75		
	2	568.90	0.55		
	3	569.40	0.50		
	4	569.85	0.45		
	5	570.25	0.40		
	6	570.75	0.50		
	7	571.40	0.65		
	8	571.85	0.45		
	9	572.45	0.60		
	10	572.95	0.50		
	11	573.45	0.50		
	12	573.95	0.50	**0.5**	
4	9:37	574.10		35.0	very small leak
	1	574.40	0.30		
	2	574.70	0.30		
	3	575.00	0.30	**0.3**	
5	9:41	575.50		20.0	very small leak
	1	575.70	0.20		
	2	575.95	0.25		
	3	576.15	0.20		
	4	576.40	0.25		
	5	576.55	0.15		
	6	576.80	0.25		
	7	577.05	0.25		
	8	577.30	0.25	**0.3**	

Summary	**34.5**	**46.4**
	Flow rate (gpm)	Pressure (psi)
	0.3	18.0
	0.5	35.0
	0.5	49.0
	0.3	35.0
	0.3	20.0

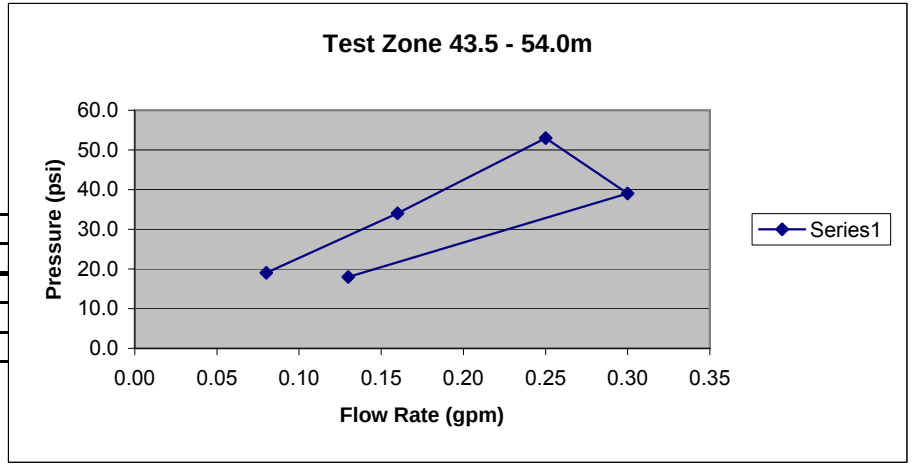


Test 3 43.5 54

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments
1	0	78.90		18.0	
	1	79.10	0.20		
	2	79.35	0.25		
	3	79.55	0.20		
	4	79.65	0.10		
	5	79.75	0.10		
	6	79.90	0.15		
	7	80.10	0.20		
	8	80.20	0.10		
		80.30	0.10		
		80.40	0.10	**0.13**	
2	0	81.20		39.0	
	1	81.50	0.30		
	2	81.80	0.30		
	3	82.00	0.20		
	3	82.30	0.30		
	4	82.55	0.25	**0.25**	
3	0	83.00		53.0	
	1	83.30	0.30		
	2	83.60	0.30		
	3	83.95	0.35		
	4	84.15	0.20		
	4	84.40	0.25		
	4	84.65	0.25		
	4	84.90	0.25	**0.25**	
4	0	84.90		34.0	
	1	85.00	0.10		
	2	85.10	0.10		
	3	85.30	0.20		
	4	85.50	0.20		
	5	85.60	0.10		
	6	85.75	0.15	**0.16**	
	0	85.65			
	1	85.70	0.05		
	2	85.75	0.05		
	3	85.85	0.10		
	4	85.95	0.10		
	5	86.00	0.05	**0.08**	

Summary **43.5** **54**

Flow rate (gpm)	Pressure (psi)
0.13	18.0
0.30	39.0
0.25	53.0
0.16	34.0
0.08	19.0



Permeability Summary

MPV-04-170c

from	to		Step 1	Step 2	Step 3	Step 4	Step 5	Avg K
25.5	36	gauge (psi)	12	25	36	25	12	
		Qavg (igpm)	0.08	0.15	0.1	0.05	0	
		K cm/sec	**5.0E-06**	**4.5E-06**	**2.1E-06**	**1.5E-06**	**0.0E+00**	2.6E-06
34.5	46.4	gauge (psi)	18	35	49	35	20	
		Qavg (igpm)	0.3	0.5	0.5	0.3	0.25	
		K cm/sec	**1.1E-05**	**9.5E-06**	**6.8E-06**	**5.7E-06**	**8.3E-06**	8.3E-06
43.5	54	gauge (psi)	18	39	53	34	19	
		Qavg (igpm)	0.13	0.3	0.25	0.16	0.08	
		K cm/sec	**5.5E-06**	**5.8E-06**	**3.6E-06**	**3.6E-06**	**3.2E-06**	4.3E-06
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	

Equations:

$Hf = 8.65 \times 10^{-15} (Q^2 * Lp / rp^5)$

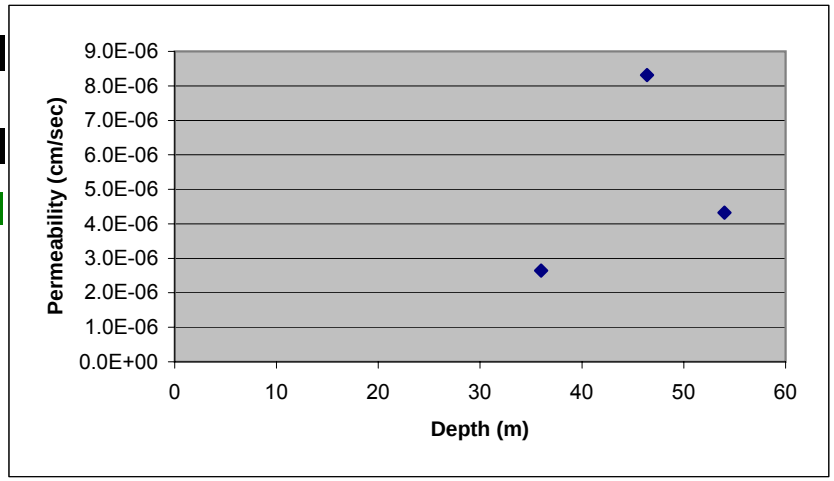
$H_{nit} = (Dw' + Hg - Hf) + Pg/1.42$

$K = (Q * Ln(R/r_b))/2 * \pi * H_{nit} * L)$

Overall **5.1E-06**

assume
- vertical drillhole
- water at ground surface
- height of gauge is at rig flr
- negligible friction losses

Dw	Measured depth of static water (1)	*0*	m
Dp	Measured depth to packer		m
Dt	Depth to midpoint of test		m
Inc	Inclination from horizontal	*90*	m
Dw'	Vertical depth to static water level		°
Dp'	Vertical depth to packer		m
Dt'	Vertical depth to midpoint of test		m
Hg	Gauge height	*0*	m
Lp	Length of discharge pipe		m
rp	Radius of discharge pipe (1" = 0.0127m)		m
R	Radius of influence (10m is standard)	10	m
rb	Drillhole radius (HQ=0.048m, NQ=0.038m)	0.038	m
L	Length of test section		m
Hf		0	m



Reflex Readings

MPV-04-170c

Date	16-Mar-04
Hole Depth (m)	54
Azi/Dir	137.8
Incl/dip	88.7
Roll (Toolface re to Mag N)	222.9
Magnetic Field	5713
Temp ©	8

FIELD GEOLOGICAL LOG

HOLE ID **MPV-04-170c**

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	0.60	Ice			MS/RB
0.6	3.20	Water			MS/RB
3.20	4.30	OVBN			MS/RB
4.20	54.00	BGRN		biotite rich **granite**, some quartz veins, most joints carbonate coated, undular and planar.	MS/RB

UCS SAMPLES

HOLE ID: MPV-04-170C

HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-170C	12	49.94-50.22	GRANITE	04-UCS-170-001

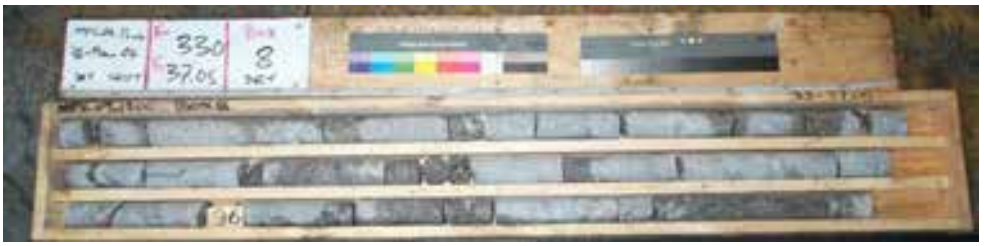
POINT LOAD TEST - INPUT

DRILL HOLE ID: MPV-04-170C

No. #	Tested by	DATE	HOLE/ FACE ID	DIST. (m)	ROCK TYPE	TEST TYPE	ORINT	DAYS	W (mm)	D (mm)	P (kN)	COMMENT
	BAM	04/06/2004	MPV-04-170C	49.90	GRANITE	1	LEFT			47.53	**900.00**	GOOD BREAK
	BAM	04/06/2004	MPV-04-170C	49.90	GRANITE	1	LEFT			47.53	1030.00	GOOD BREAK
	BAM	04/06/2004	MPV-04-170C	50.22	GRANITE	1	RIGHT			47.53	930.00	GOOD BREAK
	BAM	04/06/2004	MPV-04-170C	50.22	GRANITE	1	RIGHT			47.53	1350.00	GOOD BREAK
	BAM	04/06/2004	MPV-04-170C	50.22	GRANITE	1	RIGHT			47.53	1200.00	GOOD BREAK

MPV_04_170C

MPV_04_170C



MPV_04_170C


41.05
45.27
10
DRY


45.27
49.50
11
DRY


49.50
53.80
12
DRY


MPV_04_170c
16-May 04
DAY SHIFT
From
53.80
To
54.00
Box
13
DRY
MPV_04_170c 6X 13
54
EOJ

MPV_04_172C


12.00
15.60m
Box
1
DRY


15.60m
20.0m
Box
2
DRY


20.0m
24.2m
Box
3
DRY


24.2m
Box
4
DRY

Diary

MPV-04-172c

target depth is 62m

NS 16/03/2004	J Siddorn
1900	setup
1930	misfiring ice auger, standby until fixed
2100	setting casing
2200	rig floor at 0.0m … depth to top of …
	ice = 0.6m
	water = 2.6m
	top of lake bed = 10.8m
	water depth 10.8m
2300	casing set to 12.3m depth
2300	dropping core barrel and rods
	beginning to drill
0100	intersected amphibolite gneiss at 20.43m
0200	packer test 15.5m-23m interval
0300	resume drilling
0400	amphibolite gneiss 20.43-23.79m depth
0500	packer test 24.5-32m interval
0600	resume drilling
0630	End of shift @ 32m
DS17/03/2004	R Bowden
0730	at 35m
0820	at 38m
0840	new drill bit at 38m
0920	at 40.8m
1020	at 43.9
1100	packer test completed
1430	at 53
1500	packer test, 42.5 - 53.0m
1600	packer test completed
1700	at 59m
1900	packer at 51.5m - 62.0m

SRK Consulting
Engineers and Scientists

FIELD DRILL PERFORMANCE LOG

PROJECT	**Gahcho Kue Geotech**
PROJECT NO	**2CD002.11**
NORTHING	7036644.33
EASTING	589928.43
SURFACE ELEVATION	404.5
AZIMUTH	0
DIP	90

HOLE NO:	**MPV-04-172c**
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	1900 March 16, 2004
FINISH DATE AND TIME	1900 March 17, 2004
HOLE DIAMETER	47.6 (NQ)
DRILLING METHOD	Diamond core

				Period Totals								Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
NS 1900-0700	J Siddorn	16.03.04	0630	12	4	32	drill setup, set casing, ice auger misfiring	32	8	4.00	12	4	8	4.00
DS 0700-1900	R Bowden	17-03-04	1900	12	0	62.00	plus 3 packer tests	30	12	2.50	24	4	20	3.10
NS 1900-0700	J Siddorn	17.03.04	2000				start of move							

OVERALL HOLE DRILL RATE (m/hr)	2.58
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	3.10

GENERAL GEOTECH LOG

DRILLHOLE ID: **MPV-04-172c**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
12.00	14.00	2.00	GR	1.90	95.0	1.90	95.0	1.90	95.0	
14.00	17.00	3.00	GR	2.98	99.3	2.98	99.3	2.98	99.3	
17.00	20.00	3.00	GR	2.93	97.7	2.93	97.7	2.93	97.7	
20.00	20.43	0.43	GR	0.43	100.0	0.43	100.0	0.43	100.0	
20.43	23.00	2.57	AMP	2.57	100.0	2.57	100.0	2.57	100.0	amphibolite gneiss
23.00	23.79	0.79	AMP	0.79	100.0	0.79	100.0	0.79	100.0	amphibolite gneiss
23.79	26.00	2.21	GR	2.21	100.0	2.21	100.0	2.03	91.9	granite
26.00	29.00	3.00	GR	2.91	97.0	2.91	97.0	2.85	95.0	granite
29.00	32.00	3.00	GR	3.00	100.0	3.00	100.0	2.98	99.3	granite
32.00	35.00	3.00	GR	3.00	100.0	3.00	100.0	3.00	100.0	granite
35.00	38.00	3.00	GR	3.00	100.0	2.88	96.0	2.77	92.3	
38.00	40.80	2.80	GR	2.80	100.0	2.78	99.3	2.66	95.0	
40.80	43.90	3.10	GR	3.10	100.0	3.02	97.4	2.80	90.3	
43.90	47.00	3.10	GR	3.10	100.0	3.10	100.0	3.03	97.7	
47.00	50.00	3.00	GR	3.00	100.0	3.00	100.0	3.00	100.0	
50.00	53.00	3.00	GR	3.00	100.0	2.96	98.7	2.53	84.3	
53.00	56.00	3.00	GR/GNG	3.00	100.0	2.67	89.0	2.39	79.7	Granite/ Gneissic granite
56.00	59.00	3.00	GR/GNG	3.00	100.0	2.98	99.3	2.91	97.0	
59.00	62.00	3.00	GR	3.00	100.0	3.00	100.0	3.00	100.0	Granite/ Gneissic granite
		0.00								
		0.00								
		0.00								
		0.00								
		0.00								

DETAILED GEOTECHNICAL LOG

DRILLHOLE ID: **MPV-04-172c**

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

FROM	TO	ROCK	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of			JOINT CONDITIONS				COMMENT
(m)	(m)	TYPE	STRONG R	WEAK R	% WEAK	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH	Sets	Type	Totals	ANGLE	ROUGH	ALT	FILL	
12.0	14.0	GR	R5		0	3	0	3	0	0	0	0	1	J1	3	45	6	0	9	
14.0	17.0	GR	R5		0	7	0	5	0	0	0	0	2	J1	4	60	8	0	9	carbonate infill in J2
														J2	1	48	6	0	2	
17.0	20.0	GR	R5		0	7	0	6	0	0	0	0	3	J1	1	20	4	0	9	carbonate infill in J2
														J2	2	45	6	0	2	
														J3	3	70	7	0	9	
20.0	20.4	GR	R5		0	1	0	0	0	0	0	0	1	J1	1	42	5	1	2	carbonate infill in J1
20.4	23.0	AMP	R5		0	8	0	5	0	0	0	0	2	J1	3	60	4	0	9	
														J2	2	120	6	0	9	
23.0	23.8	AMP	R5		0	3	0	3	3	1	0	0	2	J1	1	35	6	0	2	carbonate infill in J1 and J2
														J2	2	45	6	0	2	
23.8	26.0	GR	R5		0	11	0	9	0	0	0	0	3	J1	3	45	4	0	9	
														J2	2	30	6	0	9	
														J3	4	90	5	0	9	
26.0	29.0	GR	R5		0	12	0	9	0	0	0	0	3	J1	7	70	6	0	9	minor fe staining in J1
														J2	1	30	4	0	9	
														J3	1	45	6	0	9	
29.0	32.0	GR	R5		0	13	0	6	0	0	0	0	2	J1	5	90	6	1	2	fe staining in J1 carbonate in J2
														J2	1	45	7	0	2	
32.0	35.0	GR	R5		0	9		4	0		0		3	J1	1	20	7	0	9	
														J2	1	40	7	0	3	
														J3	1	20	5	0	9	
35.0	38.0	GR	R5		0	14		10	0		0		3	J1	1	10	7	0	5	J3 has angles 80-85 and carbonate coating on 2 joints
														J2	1	80	2	0	5	
														J3	3		2	0	9	
38.0	40.8	GR	R5		0	7		6	0		0		3	J1	1	25	7	0	5	**J1 has clayey/silt gouge over entire joint**
														J2	3	55	7	0	3	
														J3	2	45	7	0	9	
40.8	43.9	GR	R5		0	10		4	1	0	0			J1	1	7	6	0	5	
														J2	2	80	5	0	3	
														J3	1	52	2	0	9	
43.9	47.0	GR	R5		0	15		11	0		0		3	J1	1	5	9	0	3	J3 has angles between 45 and 60 and occasional partial carbonate coating
														J2	2	55	7	0	9	
														J3	5		5	0	9	
47.0	50.0	GR	R5		0	12		7	0		0		3	J1	1	55	7	0	3	
														J2	2	45	5	0	3	
														J3	1	80	4	0	3	
50.0	53.0	GR	R5		0	21		17	0		0		3	J1	1	38	6	0	9	J3 has various angles- 50 (3), 20 (1) and 75 (1), and all but ine have carbonate coatings
														J2	1	55	7	0	9	
														J3	5		4	0	3	
53.0	56.0	GR/GNG	R5		0	38		16	0		0		3	J1	1	70	6	0	6	**GNG=Gneissic Granite;** J3 has angles between 40 and 60 and partial carbonate coating on a minority of joints
														J2	1	20	5	0	5	
														J3	7		4	0	9	
56.0	59.0	GR/GNG	R5		0	12		5	1	2	0		3	J1	1	45	5	0	9	
														J2	2	45	1	0	3	
														J3	1	20	4	0	3	
59.0	62.0	GR/GNG	R5		0	8	0	6	0	0	0		3	J1	2	20	1	0	2	carbonate in J1
														J2	2	90	5	0	9	
														J3	2	45	4	0	9	
																				end of hole

Photo Record

MPV-04-172c

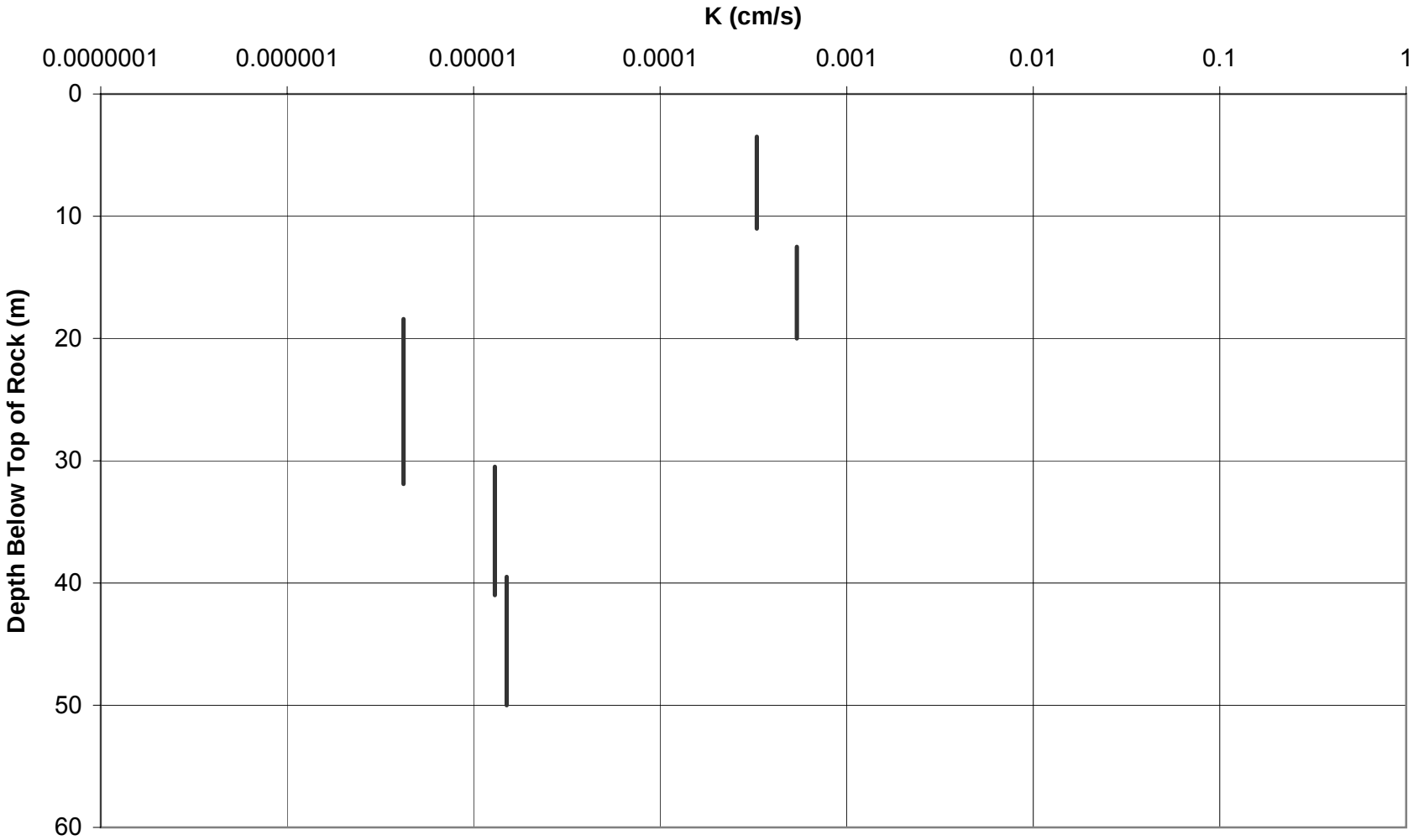
Date	Shift	Filename	Depth	Description
16/03/04	NS 1900-0700	MPV-04-172c_12m_Box1_dry	12-15.6	Box 1 core
16/03/04	NS 1900-0700	MPV-04-172c_15.6m_Box2_dry	15.6-20	Box 2 core
16/03/04	NS 1900-0700	MPV-04-172c_20.0m_Box3_dry	20-24.2	Box 3 core
16/03/04	NS 1900-0700	MPV-04-172c_24.2m_Box4_dry	24.2-28.4	Box 4 core
17/03/2004	DS 0700-1900	MPV-04-172c_28.4m_Box5_dry	28.4 - 32.6	
17/03/2004	DS 0700-1900	MPV-04-172c_32.6m_Box6_dry	32.6 - 37.0	
17/03/2004	DS 0700-1900	MPV-04-172c_37.0m_Box7_dry	37.0 - 40.8	
17/03/2004	DS 0700-1900	MPV-04-172c_40.8m_Box8_dry	40.8 - 45.0	
17/03/2004	DS 0700-1900	MPV-04-172c_45.0m_Box9_dry	45.0 - 48.95	
17/03/2004	DS 0700-1900	MPV-04-172c_48.95m_Box10_dry	48.9 - 53.20	
17/03/2004	DS 0700-1900	MPV-04-172c_53.2m_Box11_dry	53.2 - 57.5	
17/03/2004	NS 1900-0700	MPV-04-172c_57.5m_Box12_dry	57.5-62	

Core Box Record

MPV-04-172c

Box	From	To	Comments
1	12.00	15.60	
2	15.60	20.00	
3	20.00	24.20	
4	24.20	28.40	
5	28.40	32.60	
6	32.60	37.00	
7	37.00	40.80	
8	40.80	45.00	
9	45.00	48.95	
10	48.95	53.20	
11	53.20	57.50	
12	57.50	61.45	
13	61.45	62.00	

Permeability vs Depth
MPV_04_172C



Packer Test Data

Date	16-Mar-04
Staff	R. Bowden, J.Siddorn
Init. WL:	0
Ref. Pt.	drill shack floor
Dip	90

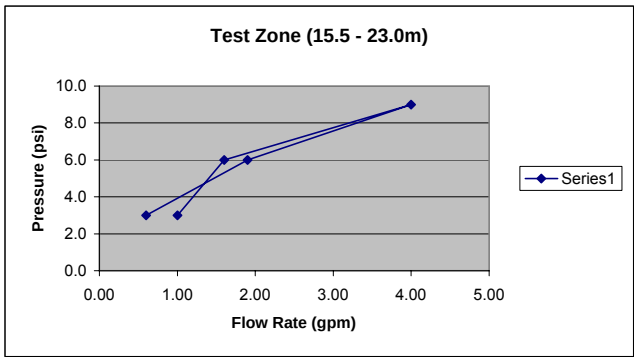
MPV-04-172c

Test 1 15.5 23

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pres (psi)	Comments
1	0	7589.00			no leaks
	1	7590.00	1.00	3.0	
	2	7591.10	1.10		
	3	7592.00	0.90		
	4	7593.00	1.00		
	5	7594.05	1.05		
	6	7594.95	0.90	1.0	
2	0	7597.50			no leaks
	1	7599.10	1.60	6.0	
	2	7600.65	1.55		
	3	7602.25	1.60		
	4	7603.85	1.60		
	5	7605.40	1.55	1.6	
3	0	7609.00			no leaks
	1	7612.70	3.70	9.0	
	2	7616.00	3.30		
	3	7619.30	3.30		
	4	7622.70	3.40		
	5	7626.05	3.35		
	6	7629.3	6.60	4.5	
4	0	7632.00			no leaks
	1	7634.00	2.00	6.0	
	2	7635.80	1.80		
	3	7637.70	1.90		
	4	7639.55	1.85		
	5	7641.50	1.95		
	6	7643.50	2.00	1.9	
5	0	7644.50			no leaks
	1	7645.05	0.55	3.0	
	2	7645.60	0.55		
	3	7646.20	0.60		
	4	7646.80	0.60		
	5	7647.45	0.65	0.6	

Summary 15.5 23

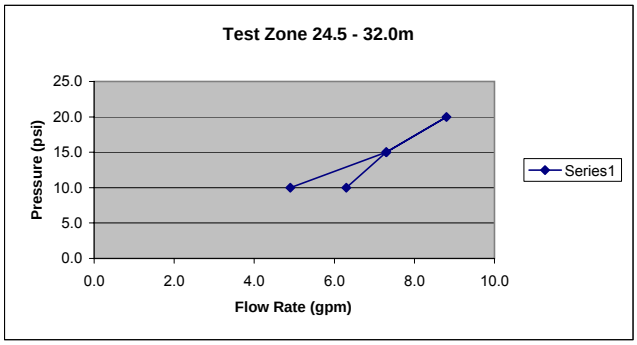
Flow rate (gpm)	Pressure (psi)
1.00	3.0
1.60	6.0
4.00	9.0
1.90	6.0
0.60	3.0



Test 2 24.5 32

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pres (psi)	Comments
1	0	7660.00	7660	**10.0**	
	1	7665.00	5.00		
	2	7669.60	4.60		
	3	7674.60	5.00		
	4	7679.50	4.90		
	5	7684.40	4.90		
	6	7689.20	4.80		
	7	7694.20	5.00	4.9	
2	0	7707.00		**15.0**	
	1	7714.40	7.40		
	2	7721.50	7.10		
	3	7728.70	7.20		
	4	7736.00	7.30		
	5	7743.40	7.40	7.3	
3	0	7790.00		**20.0**	
	1	7799.05	9.05		
	2	7807.70	8.65		
	3	7816.50	8.80		
	4	7825.30	8.80		
	5	7834.10	8.80	8.8	
4	0	7843.00		**15.0**	
	1	7850.10	7.10		
	2	7857.40	7.30		
	3	7864.80	7.40		
	4	7872.00	7.20		
	5	7879.30	7.30	7.3	
5	0	7885.00		**10.0**	
	1	7891.30	6.30		
	2	7897.40	6.10		
	3	7903.70	6.30		
	4	7909.90	6.20		
	5	7916.20	6.30	6.3	

Summary	**24.5**	**32**
	Flow rate (gpm)	Pressure (psi)
	4.9	10.0
	7.3	15.0
	8.8	20.0
	7.3	15.0
	6.3	10.0

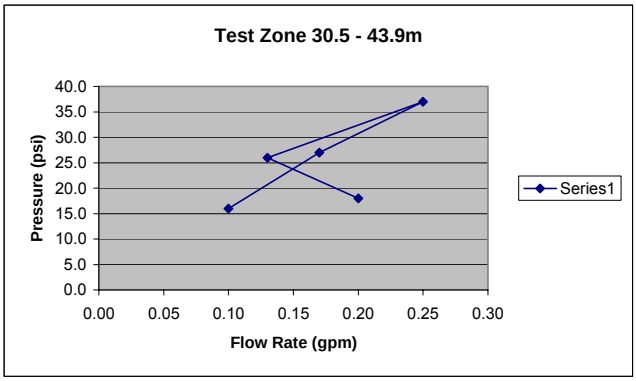


Test 3 30.5 43.9

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pres (psi)	Comments
1	0	21.20		18.0	no leaks
	1	21.45	0.25		
	2	21.70	0.25		
	3	21.90	0.20		
	4	22.10	0.20		
	5	22.30	0.20	**0.20**	
2	0	23.20		26.0	
	1	23.30	0.10		
	2	23.60	0.30		
	3	23.80	0.20		
	3	24.00	0.20		
	4	24.10	0.10		
	5	24.20	0.10	**0.13**	
3	0	24.60		38.0	
	1	24.85	0.25		
	2	25.10	0.25		
	3	25.35	0.25		
	4	25.60	0.25	**0.25**	
	5				
4	0	25.65		27.0	
	1	25.75	0.10		
	2	26.00	0.25		
	3	26.20	0.20		
	4	26.40	0.20		
	5	26.55	0.15		
		26.70	0.15	**0.17**	
5	0	26.75		16.0	
	1	26.80	0.05		
	2	26.90	0.10		
	3	27.00	0.10		
	4	27.10	0.10	**0.10**	
	5				

Summary 30.5 43.9

Flow rate (gpm)	Pressure (psi)
0.20	18.0
0.13	26.0
0.25	37.0
0.17	27.0
0.10	16.0

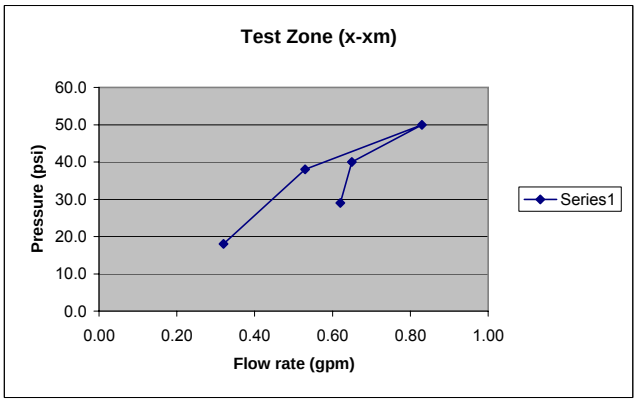


Test 4 42.5 53

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pres (psi)	Comments
1	0	29.50		29.0	
	1	30.20	0.70		
	2	30.8	0.60		
	3	31.40	0.60		
	4	32.00	0.60		
	5	32.65	0.65	**0.62**	
	6				
2	0	33.60		40.0	
	1	34.40	0.80		
	2	35.00	0.60		
	3	35.70	0.70		
	4	36.40	0.70		
	5	37.00	0.60		
	6	37.65	0.65	**0.65**	
	7				
3	0	38.40		50.0	
	1	39.20	0.80		
	2	39.90	0.70		
	3	40.60	0.70		
	4	41.45	0.85		
	5	42.25	0.80		
	6	43.10	0.85	**0.83**	
	7				
4	0	43.75		38.0	
	1	44.15	0.40		
	2	44.70	0.55		
	3	45.25	0.55		
	4	45.75	0.50	**0.53**	
	5				
	6				
5	0	46.00		18.0	
	1	46.30	0.30		
	2	46.55	0.25		
	3	46.90	0.35		
	4	47.20	0.30		
	5	47.50	0.30	**0.32**	

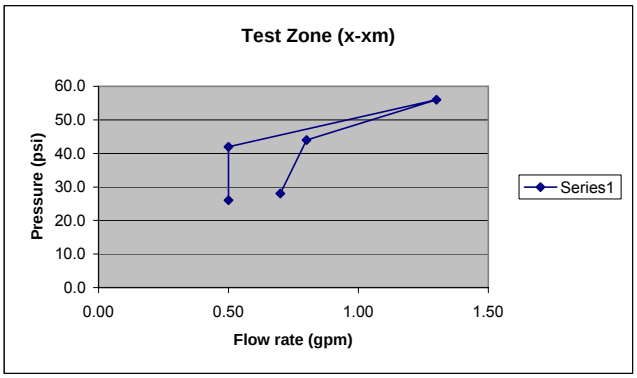
Summary 42.5 53

Flow rate (gpm)	Pressure (psi)
0.62	29.0
0.65	40.0
0.83	50.0
0.53	38.0
0.32	18.0



Test 5	51.5	62			
Step	**Elapsed time (min)**	**Flow (gal)**	**Flow rate (gpm)**	**Gauge pres (psi)**	**Comments**
1	0	953.45		28.0	
	1	954.05	0.60		
	2	954.75	0.70		
	3	955.40	0.65		
	4	956.20	0.80		
				0.7	
2	0	957.35		44.0	
	1	958.10	0.75		
	2	958.80	0.70		
	3	959.60	0.80		
	4	960.40	0.80		
				0.8	
3	0	961.25		56.0	
	1	962.10	0.85		
	2	963.05	0.95		
	3	963.80	0.75		
	4	964.55	0.75		
	5	965.1	2.05		
	6	965.7	1.90		
	7	966.3	1.75	1.3	
4	0	967.40		42.0	
	1	967.90	0.50		
	2	968.40	0.50		
	3	969.00	0.60		
	4	969.45	0.45		
	5	969.90	0.45		
	6	970.45	0.55	0.5	
5	0	970.90		26.0	
	1	971.20	0.30		
	2	971.70	0.50		
	3	972.05	0.35		
	4	972.60	0.55		
	5	973.00	0.40		
	6	973.50	0.50		
	7	974.00	0.50		
	8	974.50	0.50	0.5	

Summary	51.5	62
	Flow rate (gpm)	Pressure (psi)
	0.70	28.0
	0.80	44.0
	1.30	56.0
	0.50	42.0
	0.50	26.0



Permeability Summary

MPV-04-172c

from	to		Step 1	Step 2	Step 3	Step 4	Step 5	Avg K
15.5	23	gauge (psi)	3	6	9	6	3	
		Qavg (igpm)	1	1.6	4	1.9	0.6	
		K cm/sec	**3.5E-04**	**2.8E-04**	**4.7E-04**	**3.4E-04**	**2.1E-04**	3.3E-04
24.5	32	gauge (psi)	10	15	20	15	10	
		Qavg (igpm)	4.9	7.3	8.8	7.3	6.3	
		K cm/sec	**5.2E-04**	**5.2E-04**	**4.7E-04**	**5.2E-04**	**6.7E-04**	5.4E-04
30.4	43.9	gauge (psi)	18	26	37	27	16	
		Qavg (igpm)	0.2	0.13	0.25	0.17	0.1	
		K cm/sec	**6.5E-06**	**2.9E-06**	**4.0E-06**	**3.7E-06**	**3.7E-06**	4.2E-06
42.5	53	gauge (psi)	29	40	50	38	18	
		Qavg (igpm)	0.62	0.65	0.83	0.53	0.32	
		K cm/sec	**1.6E-05**	**1.2E-05**	**1.3E-05**	**1.1E-05**	**1.3E-05**	1.3E-05
51.5	62	gauge (psi)	28	44	56	42	26	
		Qavg (igpm)	0.7	0.8	1.3	0.5	0.5	
		K cm/sec	**1.9E-05**	**1.4E-05**	**1.8E-05**	**9.0E-06**	**1.5E-05**	1.5E-05
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	#DIV/0!

Dw	Measured depth of static water (**1**)	*0*	m
Dp	Measured depth to packer		m
Dt	Depth to midpoint of test		m
Inc	Inclination from horizontal	*90*	m
Dw'	Vertical depth to static water level		°
Dp'	Vertical depth to packer		m
Dt'	Vertical depth to midpoint of test		m
Hg	Gauge height	*0*	m
Lp	Length of discharge pipe		m
rp	Radius of discharge pipe (1" = 0.0127m)		m
R	Radius of influence (10m is standard)	10	m
rb	Drillhole radius (HQ=0.048m, NQ=0.038m)	0.038	m
L	Length of test section		m
Hf		0	m

Equations:

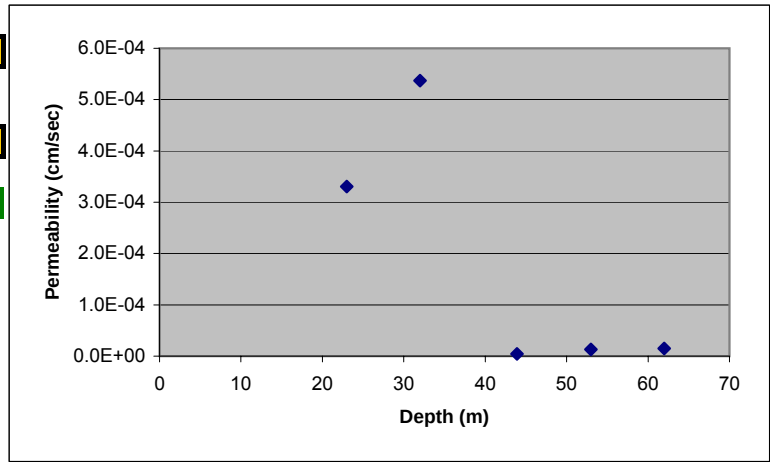
$Hf = 8.65x10^{-15} (Q^2 * Lp/rp^5)$

$H_{nit} = (Dw'+Hg-Hf)+Pg/1.42$

$K = (Q*Ln(R/r_b))/2*\pi*H_{nit}*L)$

Overall **1.8E-04**

assume
- vertical drillhole
- water at ground surface
- height of gauge is at rig flr
- negligible friction losses



Reflex Readings **MPV-04-172c**

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Field	Temp ©
17.03.04	62m	175.6	86	257.6	5975	8.5

FIELD GEOLOGICAL LOG

HOLE ID MPV-04-172c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	0.60	ICE			JS/RB
0.60	2.60	Water			JS/RB
12	62	GRN/GNG		Granite, with minor amphibolite and gneissic granite sections, occasional biotite enrichment; most joints have carbonate coatings; generally low overall permeability	JS/RB

UCS SAMPLE LIST				
HOLE #	**BOX #**	**DEPTH**	**ROCK TYPE**	**SAMPLE #**
MPV-04-172C	2	19.04	GRANITE	04-UCS-172-001

POINT LOAD TEST - INPUT

DRILL HOLE ID: MPV-04-172C

No. #	Tested by	DATE	HOLE/ FACE ID	DIST. (m)	ROCK TYPE	TEST TYPE	ORINT	DAYS	W (mm)	D (mm)	P (PSI)	COMMENT	
	BAM	04/08/2004	MPV-04-172C	18.90	GRANITE	1	LEFT			47.30	1650.00	GOOD TEST	
	BAM	04/08/2004	MPV-04-172C	18.90	GRANITE	1	LEFT			47.30	1650.00	GOOD TEST	
	BAM	04/08/2004	MPV-04-172C	18.90	GRANITE	1	LEFT			47.30	2450.00	GOOD TEST	
	BAM	04/08/2004	MPV-04-172C	19.40	GRANITE	1	RIGHT			47.30	1620.00	GOOD TEST	
	BAM	04/08/2004	MPV-04-172C	19.40	GRANITE	1	RIGHT			47.30	1750.00	GOOD TEST	
	BAM	04/08/2004	MPV-04-172C	19.40	GRANITE	1	RIGHT			47.30	1870.00	GOOD TEST	
	BAM	04/08/2004	MPV-04-172C	19.40	GRANITE	1	RIGHT			47.30	1770.00	FAIR TEST	ANGLED BREAK

MPV_04_173C

MPV_04_173C

Diary

MPV-04-173c

Target depth 32m

NS 18/03/2004 J Siddorn

2200 drill move
0030 drill setup
0130 casing
0130 0.5m drill rig to ice
0200 2m ice thickness (to 2.5m depth)
0200 8m water (to 10.5m depth)
0230 1.5m till (to 12m depth)
0230 **bedrock @ 12m**
0230 casing to 11.5m need to deepen to put return funnel on
0300 coring NQ
0400 reaming casing down to 12m
0500 resume drilling
0530 @15m depth (3m into bedrock)
0600 @18m depth (6m into bedrock)
0600 tried to pull core but frozen inside rod
0600 trying to circulate hot water to remove ice plug inside rod
0630 end of shift @ 18m
Need to unfreeze rods first and pull core

DS 18/03/2004 R Bowden

at 21m - packer test 16.5m; could only remove 2 rods; third rod jamming, unlikely to get
0800 packer down if removed and also likelihood of having to ream.
0900 packer test terminated early because of no-flow test results
0940 at 24m
packer at 27
1130 at 29
1240 at 33m; packer test
1330 packer complete; reflex underway
1500 grouted
staked
1600 moving to D3-GB-2

SRK Consulting
Engineers and Scientists

FIELD DRILL PERFORMANCE LOG

PROJECT	**Gahcho Kue Geotech**
PROJECT NO	**2CD002.11**
NORTHING	7036685.23
EASTING	589979.31
SURFACE ELEVATION	405.35
AZIMUTH	0
DIP	90

HOLE NO:	**MPV-04-173c**
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	0000 18.03.04
FINISH DATE AND TIME	1030 Feb 19, 2004
HOLE DIAMETER	47.6 (NQ)
DRILLING METHOD	Diamond core

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
NS 1900-0700	J Siddorn	18.03.04	0630	12	10	18.00	drill move, setup, casing, frozen rods	18	2	9.00	12	10	2	9.00
DS 0700-1900	R Bowden	19.03.04	1830	12	3.5	32.00		14	8.5	1.65	24	13.5	10.5	3.05

OVERALL HOLE DRILL RATE (m/hr)	1.33
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	3.05

GENERAL GEOTECH LOG

DRILLHOLE ID: **MPV-04-173c**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
12.00	13.00	1.00	AMP	1.00	100.0	1.00	100.0	1.00	100.0	amphibolite gneiss
13.00	15.00	2.00	AMP	2.00	100.0	1.80	90.0	1.80	90.0	amphibolite gneiss
15.00	18.00	3.00	GRN	3.00	100.0	2.98	99.3	2.98	99.3	granite
18.00	21.00	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
21.00	24.00	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
24.00	27.00	3.00	GRN	3.00	100.0	3.00	100.0	2.88	96.0	
27.00	30.00	3.00	GRN/GGN	3.00	100.0	3.00	100.0	2.91	97.0	GGN = Gneissic Granite
30.00	33.00	3.00	GRN/GGN	3.00	100.0	2.90	96.7	2.77	92.3	

DETAILED GEOTECHNICAL LOG

DRILLHOLE ID: **MPV-04-173c**

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

FROM	TO	ROCK	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of			JOINT CONDITIONS				COMMENT
(m)	(m)	TYPE	STRONG R	WEAK R	% WEAK	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH	Sets	Type	Totals	ANGLE	ROUGH	ALT	FILL	
12.0	13.0	**AMP**	R5		0	1		1					1	J1	1	60	4	0	9	
13.0	15.0	**AMP**	R5		0	15		10					3	J1	1	25	7	0	2	carbonate in J1 and J2
														J2	4	60	4	0	2	
														J3	5	120	7	0	9	
15.0	18.0	**GRN**	R6		0	9		2	0		0		1	J1	2	60	4	0	9	
18.0	21.0	**GRN**	R6		0	0			0		0									no natural fractures
21.0	24.0	**GRN**	R6		0	4		1	0		0		1	J1	1	80	4	0	3	partial coating of carbonate
24.0	27.0	**GRN**	R6		0	9		4	0		0		3	J1	1	3	3	0	3	J2 has partial carbonate coating
														J2	1	36	7	0	3	
														J3	2	87	4	0	9	
27.0	30.0	**GRN/GGN**	R6		0	12		5	0		0		3	J1	1	28	3	0	9	J2 hs angles of 45, 60 and 80; 2 of 3 joints have carbonate coating
														J2	3		5	0	3	
														J3	1	10	1	0	3	
30.0	33.0	**GRN/GGN**	R6		0	22		12	0		0		3	J1	1	30	4	0	6	**Shattered zone with clay gouge at 36.6m**; J2 has one joint wuth roughness 7;
														J2	6	22	2	0	3	
														J3	2	64	4	0	3	

FIELD GEOLOGICAL LOG

HOLE ID **MPV-04-173c**

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
10.50	12.00	OVB			
12.00	15.00	Amphibolite			JS
15.00	29.50	Granite		Granite: occasional biotite enrichment, pinkish-grey, medium grained, carbonate coating on occasional joints, compact, fresh granite	RB
29.50	32.00	Gniessic Granite		Gneissic Granite	RB

Photo Record

MPV-04-173c

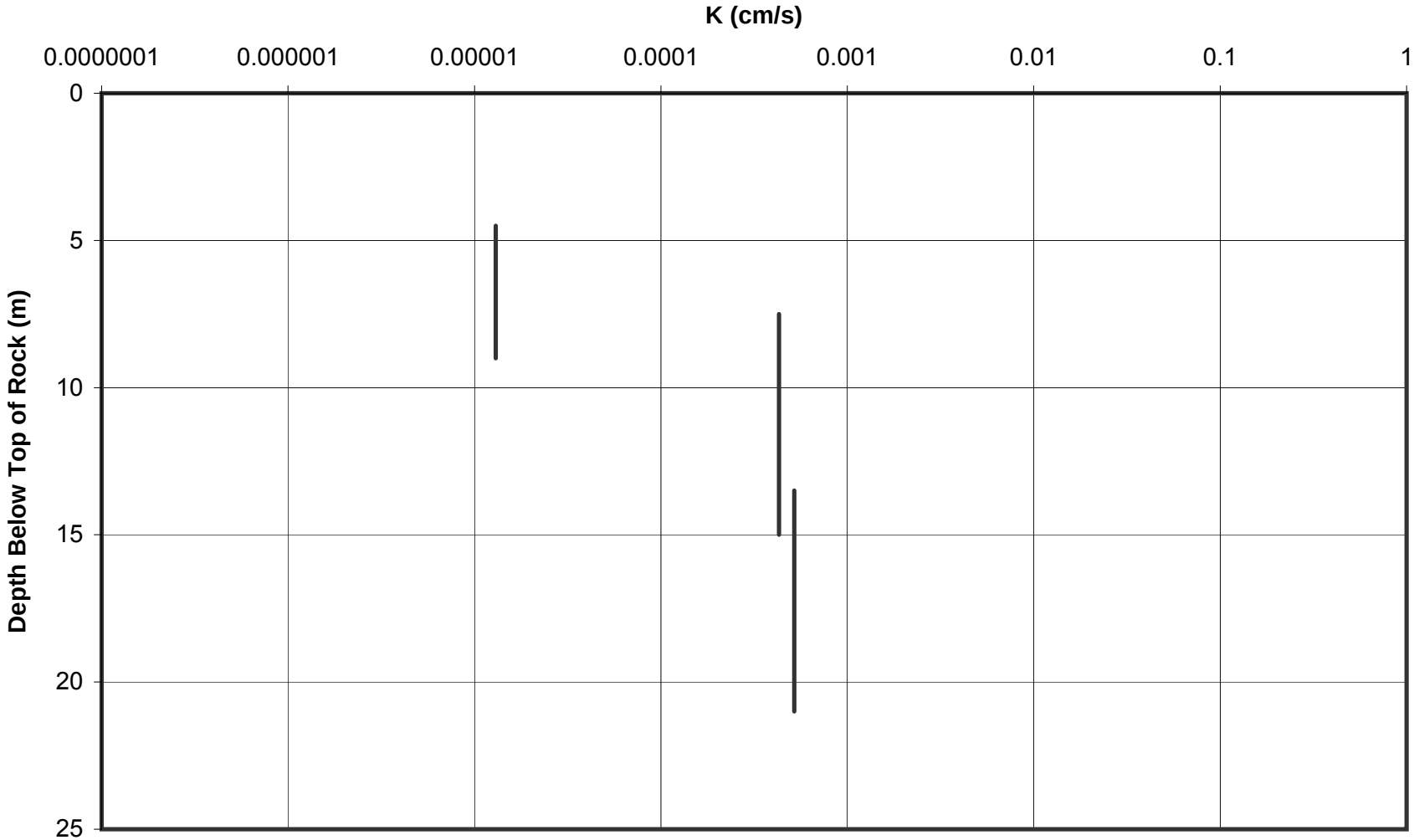
Date	Shift	Filename	Depth	Description
18-Mar-04	DS 0700-1900	MPV-04-173c_12.0m_Box1_dry	12.0 - 16.0	
18-Mar-04	DS 0700-1900	MPV-04-173c_16.0m_Box2_dry	16.0 - 20.2	
18-Mar-04	DS 0700-1900	MPV-04-173c_20.2m_Box3_dry	20.2 - 24.4	
18-Mar-04	DS 0700-1900	MPV-04-173c_24.4m_Box4_dry	24.4 - 28.4	
18-Mar-04	DS 0700-1900	MPV-04-173c_28.4m_Box5_dry	28.4 - 32.7	
18-Mar-04	DS 0700-1900	MPV-04-173c_32.7m_Box6_dry	32.7 - 33.0	

Core Box Record

MPV-04-173c

Box	From	To	Comments
1	12.00	16.00	
2	16.00	20.20	
3	20.20	24.40	
4	24.40	28.40	
5	28.40	32.70	
6	32.70	33.00	**END OF HOLE**
7			

Permeability vs Depth
MPV_04_173C



Packer Test Data

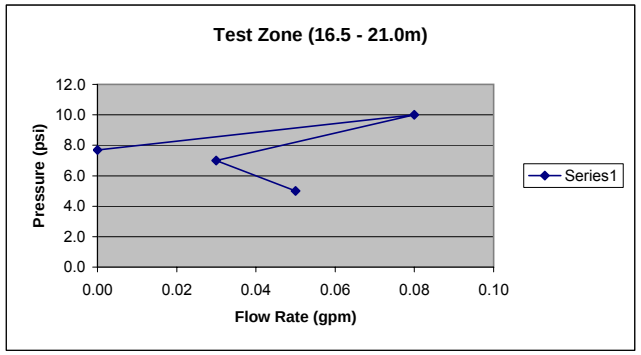
Date	18-Mar-04
Staff	
Init. WL:	0
Ref. Pt.	drill shack floor
Dip	90

MPV-04-173c

Test 1 16.5 21

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments
1	0	4.80		5.0	**no leaks**
	1	4.85	0.05		
	2	4.90	0.05		
	3	4.95	0.05		
	4	5.00	0.05	**0.05**	
	5		-5.00		
2	0	5.15		7.0	**no leaks**
	1	5.20	0.05		
	2	5.20	0.00		
	3	5.25	0.05		
	4	5.30	0.05	**0.03**	
	5				
	5				
3	0	5.60		10.5	**no leaks**
	1	5.70	0.10		
	2	5.80	0.10		
	3	5.90	0.10		
	4	5.95	0.05	**0.08**	
	5				
4	0	5.95		7.7	**no flow**
	1	5.95	0.00		
	2	5.95	0.00		
	3	5.95	0.00		
	4		-5.95		
	5		0.00		
	6		0.00	**-2.0**	
5	0				**no leaks**
	1		0.00		
	2		0.00		
	3		0.00		
	4		0.00		
	5		0.00		
	6		0.00		
	7		0.00		
	8		0.00	**0.0**	

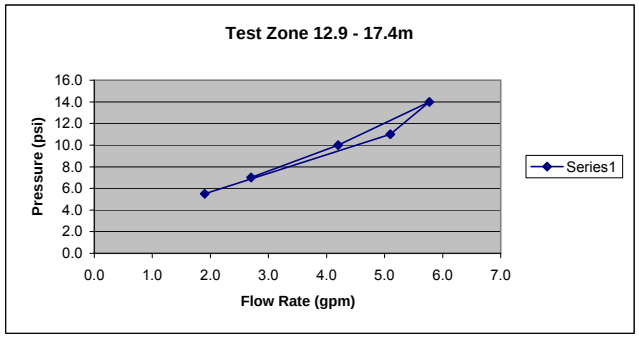
Summary	16.5	21
	Flow rate (gpm)	Pressure (psi)
	0.05	5.0
	0.03	7.0
	0.08	10.0
	0.00	7.7



Test 2 **19.5** **27**

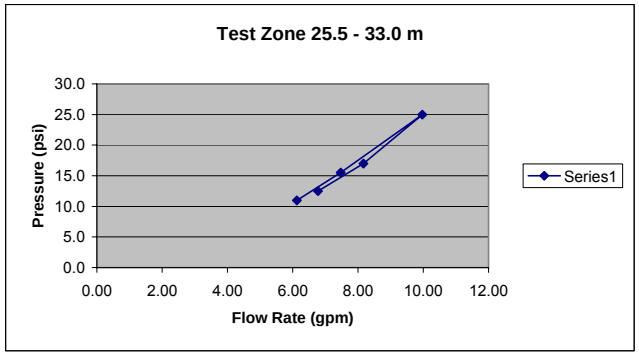
Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments
1	0	78.05		5.5	
	1	79.85	79.85		
	2	81.70	1.85		
	3	83.75	2.05		
	4	85.60	1.85		
	5	87.40	1.80	**1.90**	
	6				
2	0	91.90		11.0	
	1	97.10	5.20		
	2	102.10	5.00		
	3	107.20	5.10	**5.10**	
	4				
3	0	13.10		14.0	
	1	18.90	5.80		
	2	24.70	5.80		
	3	30.40	5.70	**5.77**	
	4				
4	0	35.20		10.0	
	1	39.30	4.10		
	2	43.60	4.30		
	3	47.70	4.10		
	4	51.80	4.10	**4.2**	
5	0	54.70		7.0	
	1	57.80	3.10		
	2	60.20	2.40		
	3	62.90	2.70		
	4	65.60	2.70		
	5	68.30	2.70	**2.70**	
	6				
	7				

Summary	**19.5**	**27**
Flow rate (gpm)	Pressure (psi)	
1.9	5.5	
5.1	11.0	
5.8	14.0	
4.2	10.0	
2.7	7.0	



Test 3	25.5	33			
Step	**Elapsed time (min)**	**Flow (gal)**	**Flow rate (gpm)**	**Gauge press (psi)**	**Comments**
1	0	77.00		12.5	
	1	83.70	6.70		
	2	90.40	6.70		
	3	97.30	6.90	**6.77**	
	4				
	5				
2	0	105.30		17.0	
	1	113.40	8.10		
	2	121.50	8.10		
	3	129.70	8.20		
	3	137.90	8.20	**8.17**	
	4				
	5				
3	0	153.10		25.0	
	1	163.10	10.00		
	2	173.10	10.00		
	3	183.00	9.90	**9.97**	
	4				
	5				
4	0	192.10		15.5	
	1	199.70	7.60		
	2	207.20	7.50		
	3	214.70	7.50		
	4	222.10	7.40	**7.47**	
	5				
5	0	228.50		11.0	
	1	234.90	6.40		
	2	241.20	6.30		
	3	247.20	6.00		
	4	253.40	6.20		
	5	259.60	6.20	**6.13**	

Summary	**25.5**	**33**
Flow rate (gpm)	Pressure (psi)	
6.77	12.5	
8.17	17.0	
9.97	25.0	
7.47	15.5	
6.13	11.0	



Permeability Summary

MPV-04-173c

from	to		Step 1	Step 2	Step 3	Step 4	Step 5	Avg K
16.5	21	gauge (psi)	5	7	10	7.7		
		Qavg (igpm)	0.05	0.03	0.08	0		
		K cm/sec	**1.8E-05**	**7.6E-06**	**1.4E-05**	**no flow**		1.3E-05
19.5	27	gauge (psi)	5.5	11	14	10	7	
		Qavg (igpm)	1.9	5.1	5.77	4.2	2.7	
		K cm/sec	**3.7E-04**	**4.9E-04**	**4.4E-04**	**4.4E-04**	**4.1E-04**	4.3E-04
25.5	33	gauge (psi)	12.5	17	25	15.5	11	
		Qavg (igpm)	6.77	8.17	9.97	7.47	6.13	
		K cm/sec	**5.7E-04**	**5.1E-04**	**4.2E-04**	**5.1E-04**	**5.9E-04**	5.2E-04
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	

Dw	Measured depth of static water (1)	*0*	m
Dp	Measured depth to packer		m
Dt	Depth to midpoint of test		m
Inc	Inclination from horizontal	*90*	m
Dw'	Vertical depth to static water level		°
Dp'	Vertical depth to packer		m
Dt'	Vertical depth to midpoint of test		m
Hg	Gauge height	*0*	m
Lp	Length of discharge pipe		m
rp	Radius of discharge pipe (1" = 0.0127m)		m
R	Radius of influence (10m is standard)	10	m
rb	Drillhole radius (HQ=0.048m, NQ=0.038m)	0.038	m
L	Length of test section		m
Hf		0	m

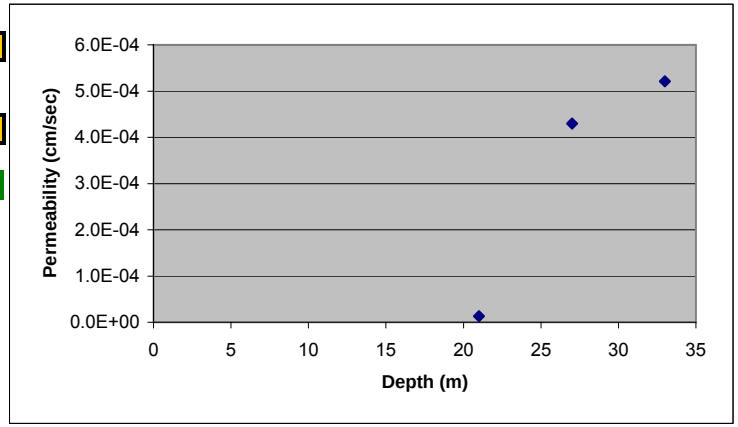
Equations:

$Hf = 8.65x10^{-15} (Q^2 * Lp/rp^5)$

$H_{nit} = (Dw' + Hg - Hf) + Pg/1.42$

$K = (Q * Ln(R/r_b))/2 * \pi * H_{nit} * L)$

Overall **3.2E-04**



assume
- vertical drillhole
- water at ground surface
- height of gauge is at rig flr
- negligible friction losses

Reflex Readings

MPV-04-173c

Date	Hole Depth	Azi/Dir	Incl/dip	olface re to	agnetic Fie	Temp ©
18-Mar-04	33	97.8	88.5	234.6	6021	6.5

UCS SAMPLE LIST				
HOLE #	**BOX #**	**DEPTH**	**ROCK TYPE**	**SAMPLE #**
MPV-04-173C	2	18.00	GRANITE	04-UCS-173-001

POINT LOAD TEST - INPUT

DRILL HOLE ID: MPV-04-173C

No. #	Tested by	DATE	HOLE/ FACE ID	DIST. (m)	ROCK TYPE	TEST TYPE	ORINT	DAYS	W (mm)	D (mm)	P (PSI)	COMMENT	
	BAM	04/08/2004	MPV-04-173C	17.90	GRANITE	1	LEFT			47.30	1700.00	FAIR TEST	
	BAM	04/08/2004	MPV-04-173C	17.90	GRANITE	1	LEFT			47.30	1300.00	GOOD TEST	
	BAM	04/08/2004	MPV-04-173C	17.90	GRANITE	1	LEFT			47.30	1460.00	GOOD TEST	
	BAM	04/08/2004	MPV-04-173C	18.40	GRANITE	1	RIGHT			47.30	1700.00	GOOD TEST	
	BAM	04/08/2004	MPV-04-173C	18.40	GRANITE	1	RIGHT			47.30	1330.00	FAIR TEST	
	BAM	04/08/2004	MPV-04-173C	18.40	GRANITE	1	RIGHT			47.30	1850.00	FAIR TEST	ANGLED BREAK
	BAM	04/08/2004	MPV-04-173C	18.40	GRANITE	1	RIGHT			47.30	1350.00	GOOD TEST	

Diary

MPV-04-174c

target depth 32m

NS 18/03/2004	J Siddorn
1900	**rig floor = 0.0m … depth to top of …**
	ice = 0.6m
	water = 2.6m
	overburden = approx 7m
	bedrock = 11.7m
2000	10.5m
2015	seal gone on chuck need to replace
2030	back to casing
2100	casing reamed to 12m
2125	setup to drill
2200	bedrock at 11.7m
2230	rods frozen in hole
2320	@ 15m
2320	need to run first packer test at 18m (13.5-18m)
0000	setup for first packer (13.5-18m)
0030	no flow in packer test
0100	resume drilling
0100	next packer at 24m (3 rods off)
0230	@24m
0245	packer test 16.5-24m
0315	no flow in packer test
0400	@27m
0500	@30m
	End of shift @33m
	Reflex done
DS 19/03/2004	R Bowden
0730	discovered that packer hose, downhole, was frozen
	redid earlier 'no flow' tests
1130	started grouting
	packed and moved to D5-GB-4

SRK Consulting
Engineers and Scientists

FIELD DRILL PERFORMANCE LOG

PROJECT	**Gahcho Kue Geotech**
PROJECT NO	**2CD002.11**
NORTHING	7034891.2
EASTING	589901.8
SURFACE ELEVATION	404
AZIMUTH	0
DIP	90

HOLE NO:	**MPV-04-174c**
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	1900 18.03.04
FINISH DATE AND TIME	1100 19.03.04
HOLE DIAMETER	47.6 (NQ)
DRILLING METHOD	Diamond core

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
NS 1900-0700	J Siddorn	18.03.04	0630	12	5	30		30	7	4.29	12	5	7	4.29
DS 0700-1900	R Bowden	19.03.04		5	5	30.00	packer testing, grouting, pack and move	0	0	#DIV/0!	17	10	7	4.29

OVERALL HOLE DRILL RATE (m/hr)	1.76
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	4.29

GENERAL GEOTECH LOG

DRILLHOLE ID: **MPV-04-174c**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
11.70	15.00	3.30	GR	3.30	100.0	2.92	88.5	2.60	78.8	altered granite
15.00	18.00	3.00	GR	3.00	100.0	2.53	84.3	2.45	81.7	altered granite (contact zone?)
18.00	21.00	3.00	GR	3.00	100.0	1.14	38.0	0.91	30.3	altered granite highly fractured fault zone, strong slickensides
21.00	24.00	3.00	GR	3.00	100.0	2.50	83.3	2.50	83.3	altered granite. Small kimberlite at end of run?
24.00	27.00	3.00	GR	3.00	100.0	1.52	50.7	1.50	50.0	altered granite
27.00	30.00	3.00	GR	3.00	100.0	2.85	95.0	2.85	95.0	altered granite
30.00	33.00	3.00	GR	3.00	100.0	2.83	94.3	2.75	91.7	altered granite
EOH	EOH									

DETAILED GEOTECHNICAL LOG

DRILLHOLE ID: **MPV-04-174c**

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling**BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

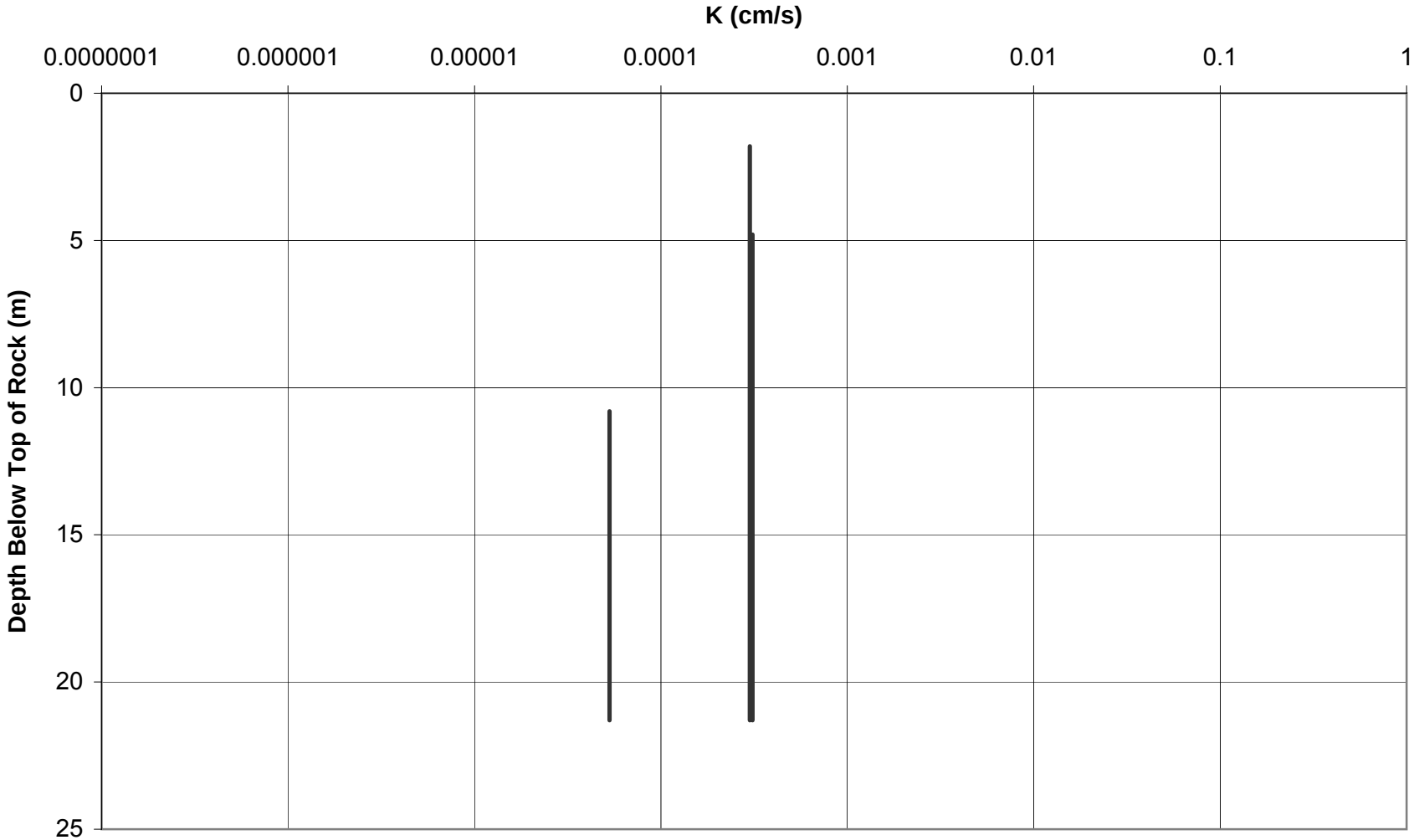
Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

FROM	TO	ROCK	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of			JOINT CONDITIONS				COMMENT
(m)	(m)	TYPE	STRONG R	WEAK R	% WEAK	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH	Sets	Type	Totals	ANGLE	ROUGH	ALT	FILL	
11.7	15.0	**GR**	R5		0	18	0	16	0	0	1	2	3	J1	2	0	4	0	9	carbonate in j2
														J2	6	25	5	0	2	
														J3	8	45	7	0	9	
15.0	18.0	**GR**	R5		0	23		17			1	2	3	J1	10	45	5	0	8	clay gouge in J1, carbonate in J2
														J2	4	25	4	0	2	
														J3	3	35	4	0	9	
18.0	21.0	**GR**	R5		0	30		30					2	J1	3	45	6	0	9	highly fractured fault zone with good slickensides
														J2	3	25	6	0	9	
21.0	24.0	**GR**	R5	R2	10	24		21					3	J1	10	60	6	0	9	small amount of kimberlite at end of run?
														J2	5	20	4	0	9	
														J3	6	45	6	0	9	
24.0	27.0	**GR**	R5	R2	10	30		30			2	2	3	J1	12	45	6	0	9	fault zone
														J2	4	30	6	0	9	
														J3	4	60	6	0	9	
27.0	30.0	**GR**	R5		0	19		10			1	2	3	J1	3	20	6	0	9	core less fractured, still number of minor faults
														J2	3	45	6	0	9	
														J3	4	60	6	0	9	
30.0	33.0	**GR**	R5		0	21		17			1	2	2	J1	4	35	6	0	9	altered granite, systematic jointing in J2
														J2	10	45	6	0	9	
														J3	3	90	6	0	9	
EOH																				

Photo Record **MPV-04-174c**

Date	Shift	Filename	Depth	Description
18.03.04	NS 1900-0700	MPV-04-174C_11.7m_Box1_dry	11.7-15.4	box 1 altered granite
18.03.04	NS 1900-0700	MPV-04-174C_15.4m_Box2_dry	15.4-19.6	box 2
18.03.04	NS 1900-0700	MPV-04-174C_19.6m_Box3_dry	19.6-23.1	box 3
18.03.04	NS 1900-0700	MPV-04-174C_23.1m_Box4_dry	23.1-27	box 4
18.03.04	NS 1900-0700	MPV-04-174C_27m_Box5_dry	27-31.2	box 5
18.03.04	NS 1900-0700	MPV-04-174C_31.2m_Box6_dry	31.2-33	box 6

Permeability vs Depth
MPV_03_174C



Packer Test Data

Date	22-Feb-04
Staff	J. Siddorn/ R. Bowden
Init. WL:	0
Ref. Pt.	drill shack floor
Dip	90

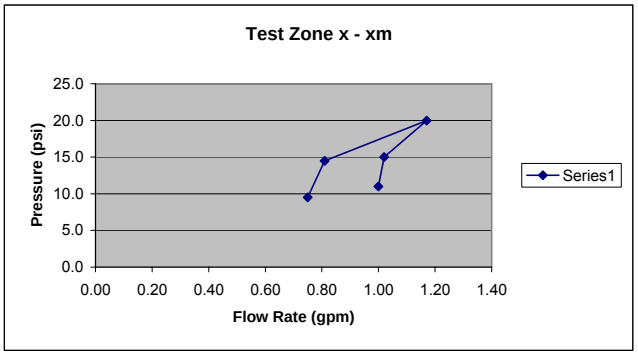
MPV-04-174c

Test 1 22.5 33

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments
1	0	84.95		11.0	
	1	85.90	0.95		
	2	87.00	1.10		
	3	87.95	0.95		
	4	88.90	0.95	**1.00**	
	5				
2	0	90.15		15.0	
	1	91.30	1.15		
	2	92.50	1.20		
	3	93.70	1.20		
	3	94.75	1.05		
	4	95.75	1.00		
	5	96.75	1.00	**1.02**	
3	0	298.10		20.0	
	1	299.30	1.20		
	2	300.45	1.15		
	3	301.65	1.20		
	4	302.80	1.15	**1.17**	
	5				
4	0	307.35		14.5	
	1	308.35	1.00		
	2	309.40	1.05		
	3	310.40	1.00		
	4	311.45	1.05		
	5	312.65	1.20		
	5	312.65	0.00	**0.81**	
5	0	15.35		9.5	
	1	16.10	0.75		
	2	16.90	0.80		
	3	17.60	0.70		
	4	18.35	0.75	**0.75**	
	5				

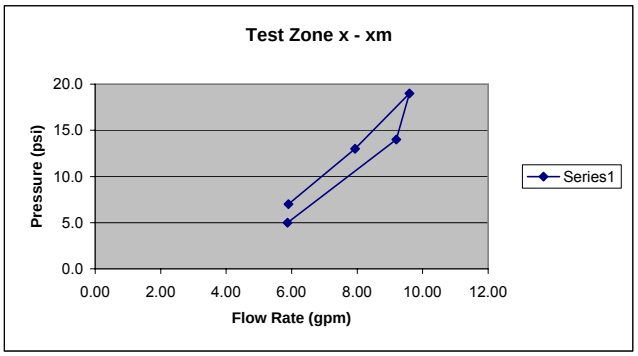
Summary **22.5** **33**

Flow rate (gpm)	Pressure (psi)
1.00	11.0
1.02	15.0
1.17	20.0
0.81	14.5
0.75	9.5



Test 2	16.5	33			
Step	**Elapsed time (min)**	**Flow (gal)**	**Flow rate (gpm)**	**Gauge press (psi)**	**Comments**
1	0	35.10		7.0	
	1	40.70	5.60		
	2	46.60	5.90		
	3	52.50	5.90		
	4	58.40	5.90	**5.90**	
	5				
2	0	65.70		13.0	
	1	73.50	7.80		
	2	81.40	7.90		
	3	89.20	7.80		
	3	97.20	8.00		
	4	105.20	8.00	**7.93**	
	5				
3	0	414.40		19.0	
	1	424.00	9.60		
	2	433.60	9.60		
	3	443.20	9.60	**9.60**	
	4				
	5				
4	0	51.90		14.0	
	1	60.30	8.40		
	2	68.70	8.40		
	3	77.20	8.50		
	4	85.70	8.50		
	5	96.20	10.50	**9.2**	
5	0	5.00			
	1	10.70	5.70		
	2	16.60	5.90		
	3	22.50	5.90		
	4	28.30	5.80	**5.87**	
	5				

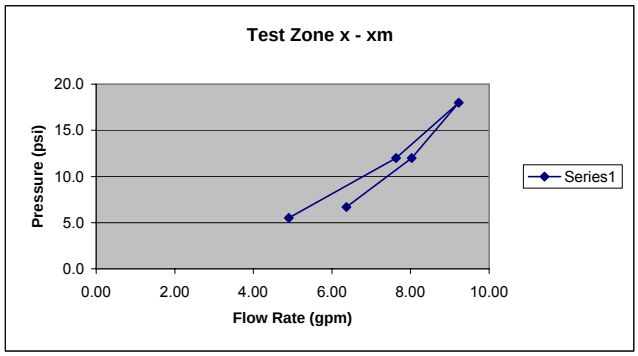
Summary	**16.5**	**33**
Flow rate (gpm)	Pressure (psi)	
5.90	7.0	
7.93	13.0	
9.60	19.0	
9.20	14.0	
5.87	5.0	



Test 3 13.5 33

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments
1	0	707.20		5.5	
	1	712.20	5.00		
	2	717.10	4.90		
	3	721.90	4.80		
	4	726.90	5.00		
	5	731.80	4.90	**4.90**	
2	0	37.50		12.0	
	1	45.10	7.60		
	2	52.70	7.60		
	3	60.30	7.60		
	3	68.00	7.70	**7.63**	
	4				
	5				
3	0	686.20		18.0	
	1	695.40	9.20		
	2	704.70	9.30		
	3	713.90	9.20	**9.23**	
	4				
	5				
4	0	722.50		12.0	
	1	730.00	7.50		
	2	738.20	8.20		
	3	746.20	8.00		
	4	754.30	8.10		
	5	762.30	8.00	**8.03**	
5	0	77.40		6.7	
	1	783.70	706.30		
	2	790.00	6.30		
	3	796.40	6.40		
	4	802.80	6.40	**6.37**	
	5				

Summary	**13.5**	**33**
Flow rate (gpm)	Pressure (psi)	
4.90	5.5	
7.63	12.0	
9.23	18.0	
8.03	12.0	
6.37	6.7	



Core Box Record

MPV-04-174c

Box	From	To	Comments
1	11.70	15.40	
2	15.40	19.60	
3	19.60	23.10	
4	23.10	27.00	
5	27.00	31.20	
6	31.20	33.00	EOH

Reflex Readings **MPV-04-174c**

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Field	Temp ©
19.03.04	33m	61.7	84	48.2	6053	7.5

Permeability Summary

MPV-04-174c

from	to		Step 1	Step 2	Step 3	Step 4	Step 5	Avg K
22.5	33	gauge (psi)	11	15	20	14.5	9.5	
		Qavg (igpm)	1	1.02	1.17	0.81	0.75	
		K cm/sec	**6.9E-05**	**5.1E-05**	**4.4E-05**	**4.2E-05**	**6.0E-05**	5.3E-05
16.5	33	gauge (psi)	7	134	19	14	5	
		Qavg (igpm)	5.9	7.93	9.6	9.2	5.87	
		K cm/sec	**4.1E-04**	**2.8E-05**	**2.4E-04**	**3.2E-04**	**5.7E-04**	3.1E-04
13.5	33	gauge (psi)	5.5	12	18	12	6.7	
		Qavg (igpm)	4.9	7.63	9.23	8.03	6.37	
		K cm/sec	**3.6E-04**	**2.6E-04**	**2.1E-04**	**2.7E-04**	**3.9E-04**	3.0E-04
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	

FIELD GEOLOGICAL LOG

HOLE ID **MPV-04-174c**

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	0.60	Snow			
0.6	2.6	Ice			
2.60	7.00	Water			
7.00	11.70	Overburden			
11.70	33.00	Granite		Altered felsic granite, massive to highly fractured; carbonate coating and clay gouge occasionally on joints	

UCS SAMPLES

HOLE ID: MPV-04-174C

HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-174C	6	32.38	Granite	04-UCS-174-001

POINT LOAD TEST - INPUT

DRILL HOLE ID: MPV-04-174C

No. #	Tested by	DATE	HOLE/ FACE ID	DIST. (m)	ROCK TYPE	TEST TYPE	ORINT	DAYS	W (mm)	D (mm)	P (kN)	COMMENT
	BAM	04/06/2004	MPV-04-174C	32.20	GRANITE	1	LEFT			48.16	1850.00	GOOD BREAK
	BAM	04/06/2004	MPV-04-174C	32.20	GRANITE	1	LEFT			48.16	1350.00	POOR BREAK
	BAM	04/06/2004	MPV-04-174C	32.80	GRANITE	1	RIGHT			48.16	1450.00	GOOD BREAK
	BAM	04/06/2004	MPV-04-174C	32.80	GRANITE	1	RIGHT			48.16	1650.00	BROKE ON DEFECT

MPV_04_174C


11.7m
15.4m
Box
1
DRY


2


19.6m
23.1m
Box
3
DRY


23.1m
27.0m
Box
4
DRY


27.0m
31.2m
Box
5
DRY


31.2m
33m
Box
6 EOH
DRY

MPV_04_175C


MPV-04-175C
11.2m
15.4m
Box 1
DRY


MPV-04-175C
15.4m
19.3m
Box 2
DRY


MPV-04-175C
19.3m
23.7m
Box 3
DRY


MPV-04-175C
23.7m
27.9m
Box 4
DRY


MPV-04-175C
27.9m
33m
Box 5&6
DRY

Diary

MPV-04-175C

DS 19/03/2004

1300 move from D3-GB-2
1600 drilled through ice
rig floor at 0.0m. Depths to top of …
ice = 0.6m
water = 2.6m
lake bed = 10.0m
bedrock = 11.2m
1900 cased to 11.5m depth

NS 19/03/2004

1900 begin drilling
2000 @12m
2100 change bit and chuck seal
2200 resume drilling
2230 @15m
2230 first packer to be done @ 21m (16.5-21m)
2315 @21m
2330 run packer test
0030 resume drilling
0100 @24m
0130 @27m
0145 packer test @ 27m (19.5-27m)
0230 resume drilling
0230 next packer @ EOH 33m (25.5-33m)
0300 @30m
0330 change bit
0440 @33m EOH
0500 reflex
0530 packer test @ 33m
0600 remove packer, pull rods
0630 grout

SRK Consulting
Engineers and Scientists

FIELD DRILL PERFORMANCE LOG

PROJECT	**Gahcho Kue Geotech**
PROJECT NO	**2CD002.11**
NORTHING	7036727.82
EASTING	590030.45
SURFACE ELEVATION	404.34
AZIMUTH	-
DIP	90

HOLE NO:	**MPV-04-175C**
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	1600 March 19, 2004
FINISH DATE AND TIME	0800 March 20, 2004
HOLE DIAMETER	47.6 (NQ)
DRILLING METHOD	Diamond core

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
DS 0700-1900	R Bowden	03/19/2004	1830	6	4	11	move on, banked in, cased	11	2	5.50	6	4	2	5.50
NS 1900-0700	J Siddorn	03/19/2004	0630	12	6	33.00	bit change, packer testing, reflex	22	6	3.67	18	10	8	4.13

OVERALL HOLE DRILL RATE (m/hr)	1.83
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	4.13

GENERAL GEOTECH LOG

DRILLHOLE ID: **MPV-04-175C**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
11.20	12.00	0.80	GR	0.80	100.0	0.80	100.0	0.80	100.0	
12.00	15.00	3.00	GR	3.00	100.0	3.00	100.0	3.00	100.0	
15.00	18.00	3.00	GR	3.00	100.0	3.00	100.0	3.00	100.0	
18.00	21.00	3.00	GR	3.00	100.0	3.00	100.0	3.00	100.0	
21.00	24.00	3.00	GR	3.00	100.0	2.95	98.3	2.95	98.3	
24.00	27.00	3.00	GR	3.00	100.0	3.00	100.0	2.91	97.0	
27.00	30.00	3.00	GR	3.00	100.0	3.00	100.0	3.00	100.0	
30.00	33.00	3.00	GR	3.00	100.0	3.00	100.0	3.00	100.0	
EOH										

DETAILED GEOTECHNICAL LOG

DRILLHOLE ID: **MPV-04-175C**

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

FROM	TO	ROCK	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of			JOINT CONDITIONS				COMMENT
(m)	(m)	TYPE	STRONG R	WEAK R	% WEAK	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH	Sets	Type	Totals	ANGLE	ROUGH	ALT	FILL	
11.2	12.0	**GR**	R5		0	8		0												
12.0	15.0	**GR**	R5		0	8		3					1	J1	1	30	9	0	9	
														J2	2	70	5	0	9	
15.0	18.0	**GR**	R5		0	14		5			1	2	2	J1	2	65	5	0	9	
														J2	3	80	5	0	9	
18.0	21.0	**GR**	R5		0	13		2					1	J1	2	80	5	0	9	
21.0	24.0	**GR**	R5		0	17		8			2	2	2	J1	6	75	5	0	9	
														J2	2	50	6	0	9	fe staining in J1
24.0	27.0	**GR**	R5		0	9		6					2	J1	3	90	5	0	9	
														J2	3	65	6	0	9	
27.0	30.0	**GR**	R5		0	5		2					1	J1	2	75	5	0	9	
30.0	33.0	**GR**	R5		0	15		6					3	J1	2	65	5	0	9	
														J2	2	90	5	0	9	
														J3	2	20	3	0	9	
EOH																				

Photo Record

MPV-04-175C

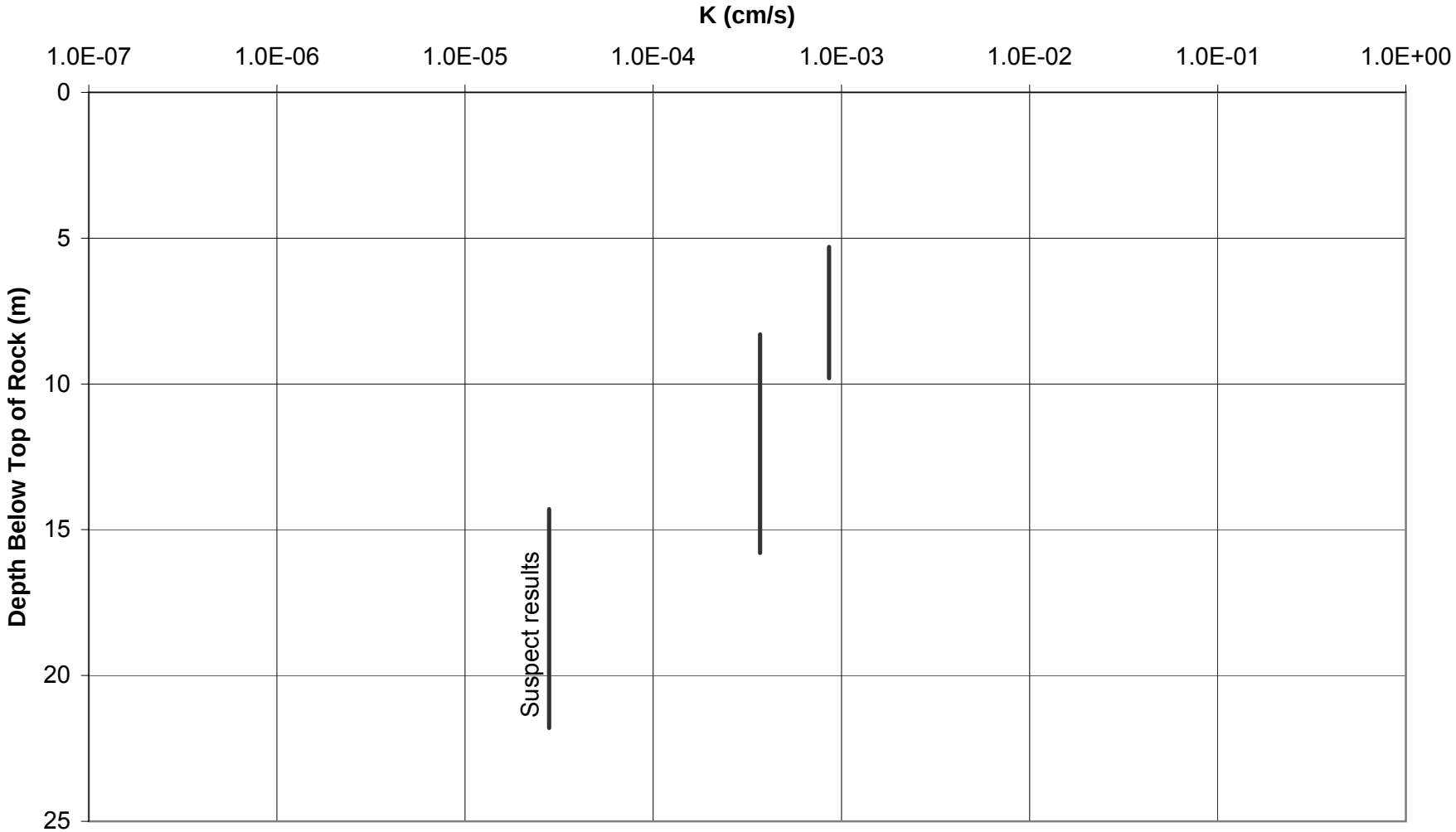
Date	Shift	Filename	Depth	Description
19.03.04	NS 1900-0700	MPV-04-175C_11.2m_Box1_dry	11.2-15.4	Box 1 granitre
19.03.04	NS 1900-0700	MPV-04-175C_15.4m_Box2_dry	15.4-19.3	Box 2 granite
19.03.04	NS 1900-0700	MPV-04-175C_19.3m_Box3_dry	19.3-23.7	Box 3 granite
19.03.04	NS 1900-0700	MPV-04-175C_23.7m_Box4_dry	23.7-27.9	Box 4 granite
19.03.04	NS 1900-0700	MPV-04-175C_27.9m_Box5_Box6_dry	27.9-33	Box 5 Box 6 EOH

Core Box Record

MPV-04-175C

Box	From	To	Comments
1	11.20	15.40	
2	15.40	19.30	
3	19.30	23.70	
4	23.70	27.90	
5	27.90	32.40	
6	32.40	33.00	EOH

Permeability vs Depth
MPV_04_175C



Packer Test Data

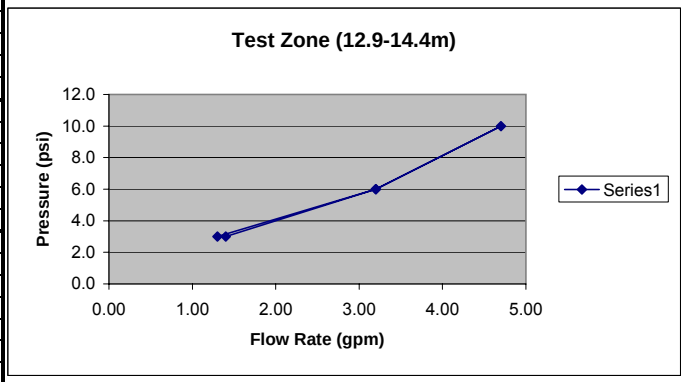
Date	19/3/2004
Staff	J. Siddorn
Init. WL:	0
Ref. Pt.	drill shack floor
Dip	90

MPV-04-175C

Test 1 16.5 21

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pres (psi)	Comments
1	0	8805.20			**no leaks**
	1	8806.60	1.40	3.0	
	2	8807.90	1.30		
	3	8809.25	1.35		
	4	8810.50	1.25		
	5	8811.80	1.30	1.32	
2	0	8815.00			**no leaks**
	1	8818.10	3.10	6.0	
	2	8821.20	3.10		
	3	8824.40	3.20		
	4	8827.60	3.20		
	5	8830.75	3.15	3.15	
3	0	8836.00			**no leaks**
	1	8840.60	4.60	10.0	
	2	8845.30	4.70		
	3	8850.00	4.70		
	4	8854.80	4.80		
	5	8859.4	4.60	4.68	
4	0	8862.00			**no leaks**
	1	8865.30	3.30	6.0	
	2	8868.50	3.20		
	3	8871.60	3.10		
	4	8874.80	3.20		
	5	8877.90	3.10	3.18	
5	0	8878.60			**no leaks**
	1	8879.90	1.30	3.0	
	2	8881.30	1.40		
	3	8882.80	1.50		
	4	8884.10	1.30		
	5	8885.40	1.30	1.36	

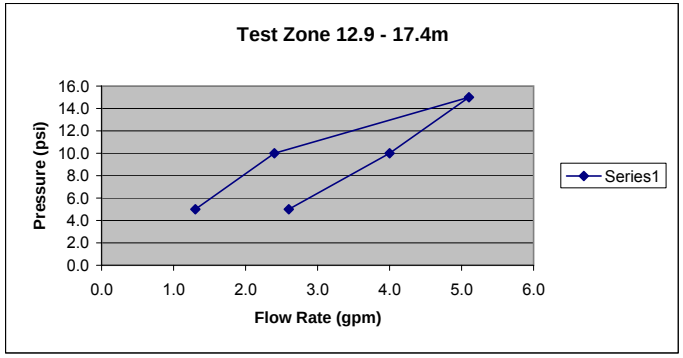
Summary	16.5	21
	Flow rate (gpm)	Pressure (psi)
	1.30	3.0
	3.20	6.0
	4.70	10.0
	3.20	6.0
	1.40	3.0



Test 2 **19.5** **27**

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pres (psi)	Comments
1	0	8887.00			
	1	8889.60	2.60	5.0	
	2	8892.20	2.60		
	3	8894.90	2.70		
	4	8897.40	2.50	2.60	
2	0	8901.60			
	1	8905.70	4.10	10.0	
	2	8909.70	4.00		
	3	8913.70	4.00		
	4	8917.60	3.90	4.00	
3	0	8921.00			
	1	8925.60	4.60	15.0	
	2	8929.80	4.20		
	3	8934.10	8.50		
	4	8938.10	4.00		
	5	8942.10	4.00	5.06	
4	0	8944.50			
	1	8947.00	2.50	10.0	
	2	8949.30	2.30		
	3	8951.60	2.30		
	4	8954.00	2.40	2.38	
5	0	8955.00			
	1	8956.30	1.30	5.0	
	2	8957.60	1.30		
	3	8958.90	1.30		
	4	8960.20	1.30	1.30	

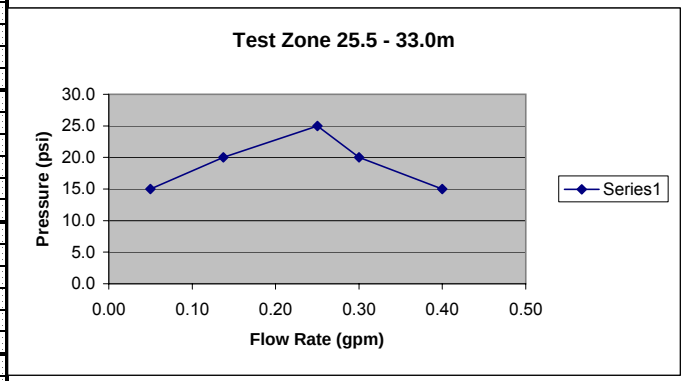
Summary	**19.5**	**27**
	Flow rate (gpm)	Pressure (psi)
	2.6	5.0
	4.0	10.0
	5.1	15.0
	2.4	10.0
	1.3	5.0



Test 3 25.5 33

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pres (psi)	Comments
1	0	8962.00			
	1	8962.40	0.40	15.0	
	2	8962.80	0.40		
	3	8963.20	0.40		
	4	8963.60	0.40		
				0.40	
2	0	8963.80			
	1	8964.10	0.30	20.0	
	2	8964.40	0.30		
	3	8964.70	0.30		
	4	8965.00	0.30		
				0.30	
3	0	8965.20			
	1	8965.45	0.25	25.0	
	2	8965.70	0.25		
	3	8965.95	0.25		
	4	8966.20	0.25		
				0.25	
4	0	8965.90			
	1	8966.05	0.15	20.0	
	2	8966.20	0.15		
	3	8966.30	0.10		
	4	8966.45	0.15		
				0.14	
5	0	8966.40			
	1	8966.45	0.05	15.0	
	2	8966.50	0.05		
	3	8966.55	0.05		
	4	8966.60	0.05		
				0.05	

Summary	25.5	33
Flow rate (gpm)	Pressure (psi)	
0.40	15.0	Steps 2-5 discounted because of either test line freezing or fines migration/blockage (RB)
0.30	20.0	
0.25	25.0	
0.14	20.0	
0.05	15.0	



Reflex Readings **MPV-04-175C**

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Field	Temp ©
19.03.04	33	10.5	89.1	89.3	5998	6.2

FIELD GEOLOGICAL LOG

HOLE ID **MPV-04-175C**

From (m)	To (m)	Material	Xeno. Content (%)	Description	Logged By
0.00	0.60	snow			RB
0.60	2.60	ice			RB
2.60	10.00	water			RB
10.00	11.20	Overburen			RB
11.20	33.00	Granite			JS

UCS SAMPLES

HOLE ID: MPV-04-175C

HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-175C	5	29.52-29.83	Granite	04-UCS-175-001

Permeability Summary

MPV-04-175C

from	to		Step 1	Step 2	Step 3	Step 4	Step 5	Avg K
16.5	21	gauge (psi)	3	6	10	6	3	
		Qavg (igpm)	1.3	3.2	4.7	3.2	1.4	
		K cm/sec	**7.7E-04**	**9.4E-04**	**8.3E-04**	**9.4E-04**	**8.2E-04**	8.6E-04
19.5	27	gauge (psi)	5	10	15	10	5	
		Qavg (igpm)	2.6	4	5.1	2.4	1.3	
		K cm/sec	**5.5E-04**	**4.2E-04**	**3.6E-04**	**2.5E-04**	**2.8E-04**	3.7E-04
25.5	33	gauge (psi)	15	20	25	20	15	
		Qavg (igpm)	0.4	0.3	0.25	0.14	0.05	
		K cm/sec	**2.8E-05**	~~**1.6E-05**~~	~~**1.1E-05**~~	~~**7.4E-06**~~	~~**3.5E-06**~~	2.8E-05
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	#DIV/0!
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	#DIV/0!
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	#DIV/0!

Equations:

$Hf = 8.65 \times 10^{-15} (Q^2 * Lp / rp^5)$

$H_{nit} = (Dw' + Hg - Hf) + Pg/1.42$

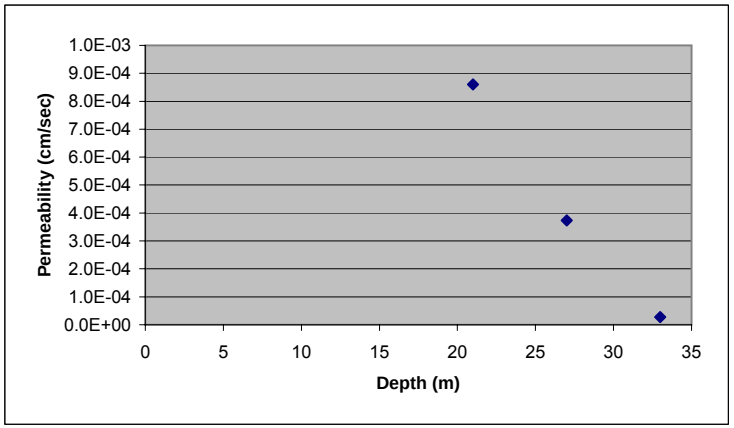
$K = (Q * Ln(R/r_b))/2 * \pi * H_{nit} * L)$

Overall **#DIV/0!**

assume
- vertical drillhole
- water at ground surface
- height of gauge is at rig flr
- negligible friction losses

Note: Test 3, Steps 2-5 discounted; possible freezing
possible freezing of pump line

Dw	Measured depth of static water (1)	*0*	m
Dp	Measured depth to packer		m
Dt	Depth to midpoint of test		m
Inc	Inclination from horizontal	*90*	m
Dw'	Vertical depth to static water level		°
Dp'	Vertical depth to packer		m
Dt'	Vertical depth to midpoint of test		m
Hg	Gauge height	*0*	m
Lp	Length of discharge pipe		m
rp	Radius of discharge pipe (1" = 0.0127m)		m
R	Radius of influence (10m is standard)	10	m
rb	Drillhole radius (HQ=0.048m, NQ=0.038m)	0.038	m
L	Length of test section		m
Hf		0	m



POINT LOAD TEST - INPUT

DRILL HOLE ID: MPV-04-175C

No. #	Tested by	DATE	HOLE/ FACE ID	DIST. (m)	ROCK TYPE	TEST TYPE	ORINT	DAYS	W (mm)	D (mm)	P (kN)	COMMENT
	BAM	04/07/2004	MPV-04-175C	29.40	GRANITE	1	LEFT			47.00	1650.00	GOOD BREAK
	BAM	04/07/2004	MPV-04-175C	29.40	GRANITE	1	LEFT			47.00	1625.00	GOOD BREAK
	BAM	04/07/2004	MPV-04-175C	29.40	GRANITE	1	LEFT			47.00	2350.00	GOOD BREAK
	BAM	04/07/2004	MPV-04-175C	29.90	GRANITE	1	RIGHT			47.00	1950.00	GOOD BREAK
	BAM	04/07/2004	MPV-04-175C	29.90	GRANITE	1	RIGHT			47.00	1650.00	GOOD BREAK
	BAM	04/07/2004	MPV-04-175C	29.90	GRANITE	1	RIGHT			47.00	1950.00	GOOD BREAK

MPV_04_176C


MPV-04-176C
20.03.2006
DAY SHIFT
From 12.8
To 17.3
Box 1
DRY


MPV-04-176C
20.03.2006
DAY SHIFT
From 17.3
To 21.35
Box 2
DRY


MPV-04-176C
20.03.2006
DAY SHIFT
From 21.35
To 25.5
Box 3
DRY


MPV-04-176C
20.03.2006
From 25.5
Box 4 & 5
DRY

Diary MPV-04-176c

target depth is 33m

DS 20/03/2004

0900	setting up
0930	**rig floor = 0.0m Depths to top of ...**
	ice = 0.6m
	water = 2.6m
	lake bed = 9.5m
	bedrock = 13.1m
1030	casing set at 13.5m
1135	rods at 18m
1200	at 21m
1230	packer test 16.5 - 21.0m started
1320	test completed
1350	at 24m
1440	at 28m
1550	packer test 19.5 - 27.0m completed
1720	at 31.5 - bit dead

DS 20/03/2004

1900	replace bit
1930	resume drilling
2015	at 33m
2030	reflex
2100	final packer test at 25.5 - 33.0m
2300	grout and move

Checklist - delete before finalizing and printing file

reflex??
grouted?
staked?
summary for Todd updated?
point load test samples selected?

SRK Consulting
Engineers and Scientists

FIELD DRILL PERFORMANCE LOG

PROJECT	**Gahcho Kue Geotech**
PROJECT NO	**2CD002.11**
NORTHING	7036771.47
EASTING	590080.72
SURFACE ELEVATION	404.8
AZIMUTH	-
DIP	90

HOLE NO:	**MPV-04-176c**
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	0900 March 20, 2004
FINISH DATE AND TIME	2200 March 20, 2004
HOLE DIAMETER	47.6 (NQ)
DRILLING METHOD	Diamond core

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
DS 0700-1900	R Bowden	03/20/2004	1900	12	4.5	31	set-up, 2 packers	31	7.5	4.13	12	4.5	7.5	4.13
NS 1900-0700	J Siddorn	03/20/2004		3	2.5	33.00	change bit, packer test, reflex, grout	2	0.5	4.00	15	7	8	4.13

OVERALL HOLE DRILL RATE (m/hr)	2.20
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	4.13

GENERAL GEOTECH LOG

DRILLHOLE ID: **MPV-04-176c**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
0.00	0.60	0.60	snow							
0.60	2.60	2.00	ice							
2.60	9.50	6.90	water							
9.50	13.10	3.60	OVB							gravel, cobbles and boulders inferred from drill response
13.10	15.00	1.90	GRN	1.90	100.0	1.90	100.0	1.90	100.0	
15.00	18.00	3.00	GRN	3.00	100.0	2.95	98.3	2.95	98.3	
18.00	21.00	3.00	GRN	3.00	100.0	2.91	97.0	2.76	92.0	
21.00	24.00	3.00	GRN	3.00	100.0	2.70	90.0	2.50	83.3	
24.00	27.00	3.00	GRN	3.00	100.0	2.98	99.3	2.92	97.3	includes small pegmatitic zone
27.00	30.00	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	

DETAILED GEOTECHNICAL LOG

DRILLHOLE ID: **MPV-04-176c**

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

FROM	TO	ROCK	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of			JOINT CONDITIONS				COMMENT
(m)	(m)	TYPE	STRONG R	WEAK R	% WEAK	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH	Sets	Type	Totals	ANGLE	ROUGH	ALT	FILL	
13.1	15.0	**GRN**	R5			10	0	2	0		0		1	J1	2	65	5	0	9	weathered joints
15.0	18.0	**GRN**	R5			10	0	4	0		0		3	J1	1	53	7	0	3	J1 has sight silt coating; J2 has hematite coating
														J2	2	50	5	0	9	
														J3	1	78	7	0	9	
18.0	21.0	**GRN**	R5			13	0	8	0		0		3	J1	1	32	5	0	3	J1 has thin silt gouge layer; J3 joints have angles of 45, 65 and 70 and weathering and/or partial carbonate coating
														J2	2	78	2	0	3	
														J3	3		4	0	9	
21.0	24.0	**GRN**	R5			31	0	5	0		0		3	J1	2	80	4	0	3	J1 has thin silt coating; J2 has one silt and one partial carbonate coating; remaining joints are highly variable in angle and roughness
														J2	2	35	7	0	3	
														J3	1	53	4	0	3	
24.0	27.0	**GRN**	R5			12	0	5	0		0		3	J1	1	82	4	0	3	J1 has partial silt coating; J3 has artial carbonate coating
														J2	1	20	5	0	9	
														J3	1	38	4	0	3	
27.0	30.0	**GRN**	R5			9	0	2	0		0		1	J1	2	75	1	0	9	partial carbomate coating
30.0	33.0	**GRN**	R5			8	0	2	0		0		2	J1	1	35	4	0	9	
														J2	1	45	5	0	9	
EOH																				

Photo Record

MPV-04-176c

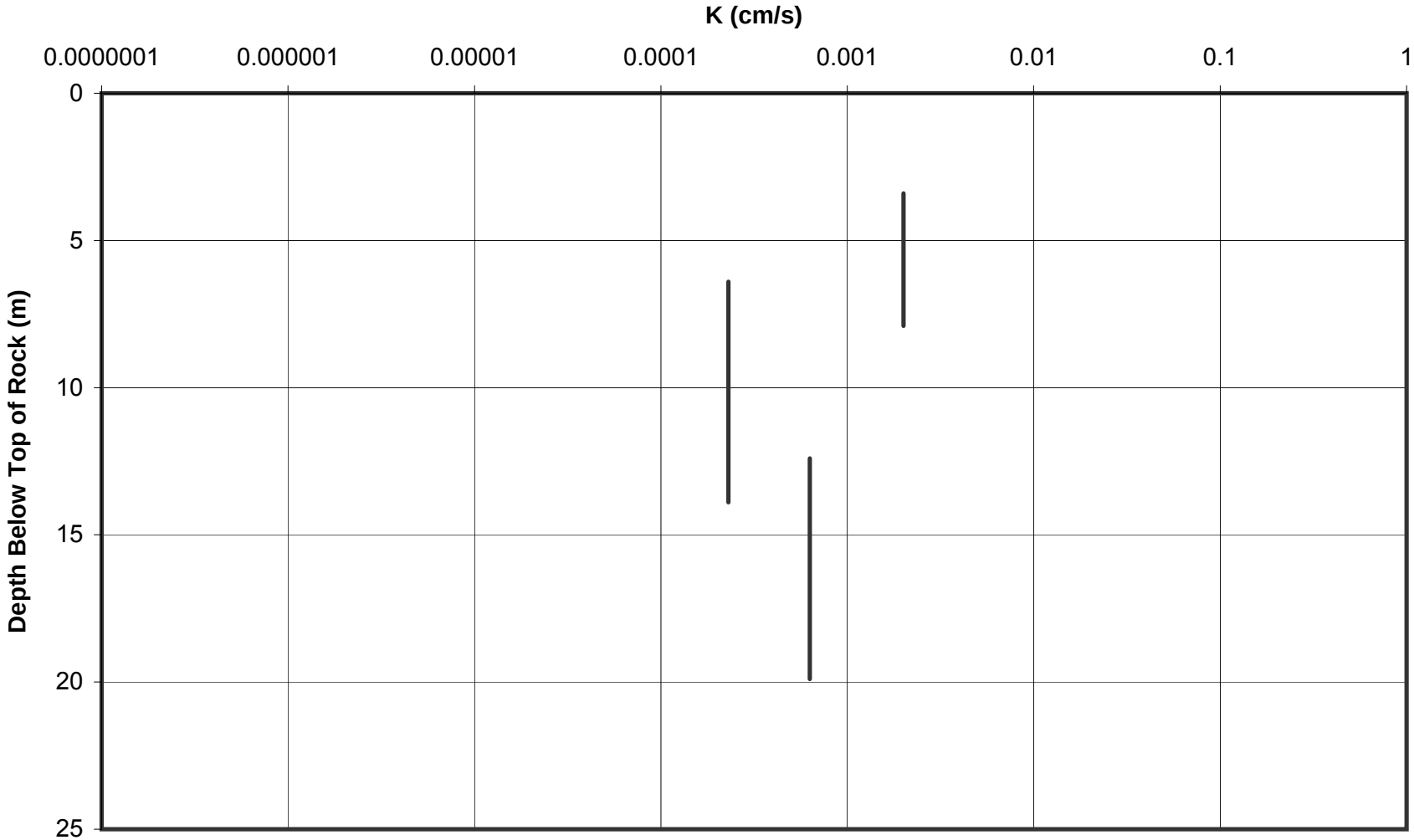
Date	Shift	Filename	Depth	Description
20-Mar-04	DS 0700-1900	MPV-04-176C_12.8m_Box1_dry	12.8 - 17.3	
20-Mar-04	DS 0700-1900	MPV-04-176C_17.3m_Box2_dry	17.3 - 21.35	
20-Mar-04	DS 0700-1900	MPV-04-176C_21.35m_Box3_dry	21.35 - 25.5	
20-Mar-04	NS 1900-0700	MPV-04-176C_25.5m_Box4_Box5	25.5-33	

Core Box Record

MPV-04-176c

Box	From	To	Comments
1	12.80	17.30	
2	17.30	21.30	
3	21.30	25.50	
4	25.50	31.20	
5	31.20	33.00	

Permeability vs Depth
MPV_04_176C



Packer Test Data

Date	20-Mar-04
Staff	R. Bowden
Init. WL:	0
Ref. Pt.	drill shack floor
Dip	90

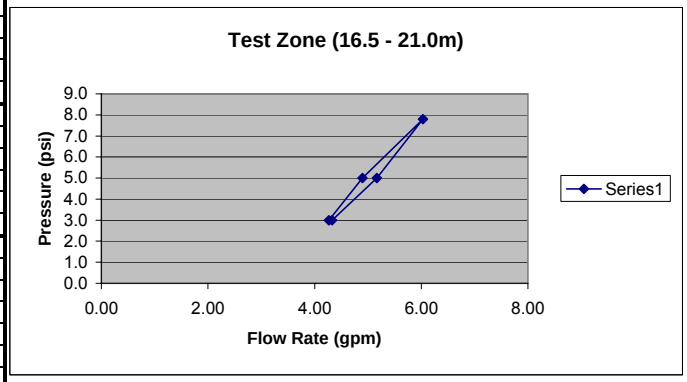
MPV-04-176c

Test 1 16.5 21

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pres (psi)	Comments
1	0	72.3		3.0	**no leaks**
	1	76.3	4.00		
	2	80.1	3.80		
	3	84.3	4.20		
	4	88.7	4.40		
	5	93.0	4.30		
	6	97.4	4.40		
	7	101.70	4.30	**4.33**	
2	0	6.60		5.0	**no leaks**
	1	11.80	5.20		
	2	17.00	5.20		
	3	22.10	5.10		
	4	27.30	5.20	**5.17**	
	5				
	5				
3	0	33.20		7.8	**no leaks**
	1	39.10	5.90		
	2	45.20	6.10		
	3	51.20	6.00		
	4	57.20	6.00	**6.03**	
	5				
4	0	62.30		5.0	**no leaks**
	1	67.30	5.00		
	2	72.20	4.90		
	3	77.10	4.90		
	4	82.00	4.90	**4.90**	
	5				
	6				
5	0	86.30		3.0	**no leaks**
	1	90.50	4.20		
	2	94.80	4.30		
	3	99.00	4.20		
	4	103.30	4.30	**4.27**	
	5				
	6				
	7				
	8				

Summary 16.5 21

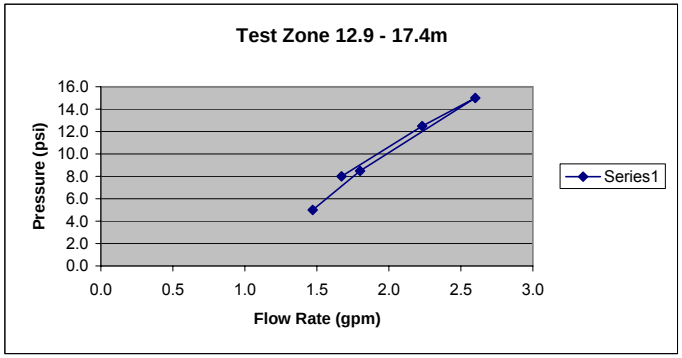
Flow rate (gpm)	Pressure (psi)
4.33	3.0
5.17	5.0
6.03	7.8
4.90	5.0
4.27	3.0



Test 2 **19.5** **27**

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pres (psi)	Comments
1	0	8.40		8.0	
	1	10.10	10.10		
	2	11.80	1.70		
	3	13.50	1.70		
	4	15.10	1.60	**1.67**	
	5				
	6				
2	0	17.20		12.5	
	1	19.30	2.10		
	2	21.40	2.10		
	3	23.70	2.30		
	4	25.90	2.20		
	5	28.10	2.20	**2.23**	
3	0	30.65		15.0	
	1	33.40	2.75		
	2	36.00	2.60		
	3	38.60	2.60		
	4	41.20	2.60		
	5	43.80	2.60	**2.60**	
4	0	45.60		8.5	
	1	47.40	1.80		
	2	49.15	1.75		
	3	50.85	1.70		
	4	52.75	1.90		
	5	54.55	1.80	**1.80**	
5	0	55.95		5.0	
	1	57.35	1.40		
	2	58.80	1.45		
	3	60.10	1.30		
	4	61.60	1.50		
	5	63.05	1.45		

Summary	**19.5**	**27**
Flow rate (gpm)	Pressure (psi)	
1.7	8.0	
2.2	12.5	
2.6	15.0	
1.8	8.5	
1.5	5.0	



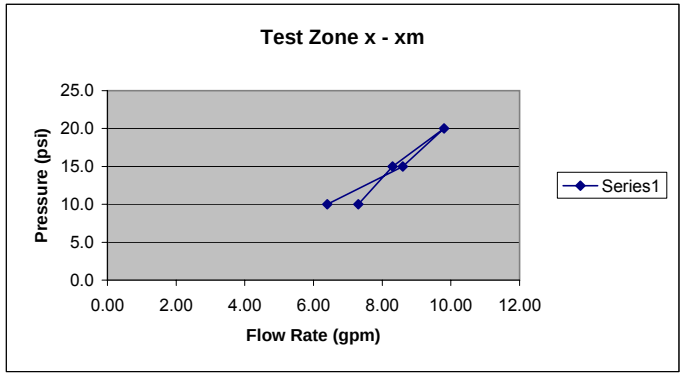
	6	64.50	1.45	**1.47**	
	7				

Test 3 **25.5** **33**

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pres (psi)	Comments
1	0	9175.00			
	1	9181.40	6.40	10.0	
	2	9187.80	6.40		
	3	9194.30	6.50		
	4	9200.80	6.50	6.4	
2	0	9210.00			
	1	9218.50	8.50	15.0	
	2	9227.00	8.50		
	3	9235.90	8.90		
	4	9244.40	8.50		
	5	9252.90	8.50	8.6	
3	0	9270.00			
	1	9279.70	9.70	20.0	
	2	9289.50	9.80		
	3	9299.30	9.80		
	4	9309.10	9.80	9.8	
4	0	9315.00			
	1	9323.50	8.50	15.0	
	2	9331.80	8.30		
	3	9340.10	8.30		
	4	9348.40	8.30	8.3	
5	0	9352.00			
	1	9359.30	7.30	10.0	
	2	9366.60	7.30		
	3	9373.90	7.30		
	4	9381.20	7.30	7.3	

Summary **25.5** **33**

Flow rate (gpm)	Pressure (psi)
6.40	10.0
8.60	15.0
9.80	20.0
8.30	15.0
7.30	10.0



FIELD GEOLOGICAL LOG

HOLE ID **MPV-04-176c**

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	0.60	snow	0.00		
0.60	2.6	ice	0.00		
2.60	9.50	water	0.00		
9.50	13.10	OVB	0.00	gravel, cobbles and boulders inferred from drill response	
13.10	33.00	Granite	0.00		

Permeability Summary

MPV-04-176c

from	to		Step 1	Step 2	Step 3	Step 4	Step 5	Avg K
16.5	21	gauge (psi)	3	5	7.8	5	3	
		Qavg (igpm)	4.33	5.17	6.03	4.9	4.267	
		K cm/sec	**2.5E-03**	**1.8E-03**	**1.4E-03**	**1.7E-03**	**2.5E-03**	2.0E-03
19.5	27	gauge (psi)	8	12.5	15	8.5	5	
		Qavg (igpm)	1.7	2.2	2.6	1.8	1.5	
		K cm/sec	**2.3E-04**	**1.9E-04**	**1.8E-04**	**2.2E-04**	**3.2E-04**	2.3E-04
25.5	33	gauge (psi)	10	15	20	15	10	
		Qavg (igpm)	6.4	8.6	9.8	8.3	7.3	
		K cm/sec	**6.8E-04**	**6.1E-04**	**5.2E-04**	**5.9E-04**	**7.7E-04**	6.3E-04
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	#DIV/0!
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	#DIV/0!
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	#DIV/0!

Overall **#DIV/0!**

Dw	Measured depth of static water (1)	*0*	m
Dp	Measured depth to packer		m
Dt	Depth to midpoint of test		m
Inc	Inclination from horizontal	*90*	m
Dw'	Vertical depth to static water level		°
Dp'	Vertical depth to packer		m
Dt'	Vertical depth to midpoint of test		m
Hg	Gauge height	*0*	m
Lp	Length of discharge pipe		m
rp	Radius of discharge pipe (1" = 0.0127m)		m
R	Radius of influence (10m is standard)	10	m
rb	Drillhole radius (HQ=0.048m, NQ=0.038m)	0.038	m
L	Length of test section		m
Hf		0	m

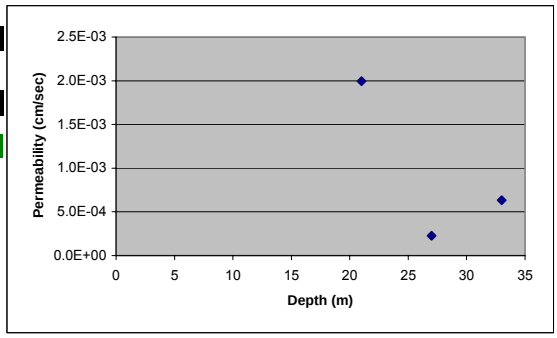
Equations:

$Hf = 8.65 \times 10^{-15} (Q^2 * Lp / rp^5)$

$H_{nit} = (Dw' + Hg - Hf) + Pg/1.42$

$K = (Q * Ln(R/r_b))/2\pi * H_{nit} * L)$

assume
- vertical drillhole
- water at ground surface
- height of gauge is at rig flr
- negligible friction losses



Reflex Readings **MPV-04-176c**

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Field	Temp ©
20.03.04	33m	159.8	88.5	207.7	6070	8.2

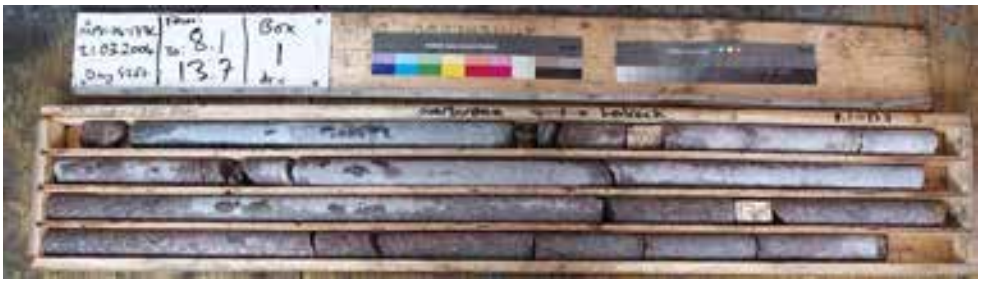
UCS SAMPLE LIST				
HOLE #	**BOX #**	**DEPTH**	**ROCK TYPE**	**SAMPLE #**
MPV-04-176C	3	24.00	GRANITE	04-UCS-176-001

POINT LOAD TEST - INPUT

DRILL HOLE ID: MPV-04-176C

No. #	Tested by	DATE	HOLE/ FACE ID	DIST. (m)	ROCK TYPE	TEST TYPE	ORINT	DAYS	W (mm)	D (mm)	P (PSI)	COMMENT	
	BAM	04/08/2004	MPV-04-176C	23.90	GRANITE	1	LEFT			47.10	2200.00	GOOD TEST	
	BAM	04/08/2004	MPV-04-176C	23.90	GRANITE	1	LEFT			47.10	1850.00	FAIR TEST	
	BAM	04/08/2004	MPV-04-176C	23.90	GRANITE	1	LEFT			47.10	1850.00	FAIR TEST	
	BAM	04/08/2004	MPV-04-176C	24.50	GRANITE	1	RIGHT			47.10	1350.00	FAIR TO POOR TEST	ANGLED BREAK
	BAM	04/08/2004	MPV-04-176C	24.50	GRANITE	1	RIGHT			47.10	1690.00	GOOD TEST	
	BAM	04/08/2004	MPV-04-176C	24.50	GRANITE	1	RIGHT			47.10	1300.00	GOOD TEST	

MPV_04_177C


From
8.1
To
13.7
Box
1


From
13.7
To
19.15
Box
2


From
19.15
To
24.8
Box
3


From
To
29.2m
Box
4
Dry

Diary

MPV-04-177c

target depth is 28.9m

NS 20/03/2004

0100	moved on to hole
0200	started casing
	rig floor = 0m Depths to top of ...
	ice = 0.6m
	water = 1.6m
	lake bed = 5.5m (est.)
	bedrock = 8.9m (based on core)
	casing set at 8.5m; reset at 10.2
0400	began coring
0500	problems with rods and inner tube entering hole

DS 21/03/04

	casing deflected off of a boulder; deviation too great; pulled casing and re-set to 10.2m
0940	rods at 9m
1020	at 12m
1050	at 15m; driller noticed total loss of return at about 13.5m
	at 18m; packer test completed: note that rods were raised an extra 1m above the rig head
1525	packer test at 24m completed
1700	at 27m - white out called

NS 21/03/2004

1900	whiteout ongoing
2130	whiteout over
1030	at 29.2m bit gone hole called
0000	packer test 22.5-29.2m
	very little flow, all lines checked and clear
	core almost contains no joints over this interval
0100	hole grouted ready to move

SRK Consulting
Engineers and Scientists

FIELD DRILL PERFORMANCE LOG

PROJECT	**Gahcho Kue Geotech**
PROJECT NO	**2CD002.11**
NORTHING	7036814.92
EASTING	590132.92
SURFACE ELEVATION	404.26
AZIMUTH	0
DIP	90

HOLE NO:	**MPV-04-177c**
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	0300 March 20, 2004
FINISH DATE AND TIME	2300 March 21, 2004
HOLE DIAMETER	47.6 (NQ)
DRILLING METHOD	Diamond core

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
NS 1900-0700	J Siddorn	20.03.04	0630	6	3.5	9	setup, problem with rods entering ddh	9	2.5	3.60	6	3.5	2.5	3.60
DS 0700-1900	R Bowden	21.03.04	1830	12	3	27.00	reset casing; whiteout;	18	9	2.00	18	6.5	11.5	2.35
NS 1900-0700	J Siddorn	21.03.04	0630	4	3.5	29.20	whiteout, packer testing	2.2	0.5	4.40	22	10	12	2.43

OVERALL HOLE DRILL RATE (m/hr)	1.33
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	2.43

GENERAL GEOTECH LOG

DRILLHOLE ID: **MPV-04-177c**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
5.50	8.90	3.40	OVB							
8.90	12.00	3.10	GRN	3.10	100.0	3.10	100.0	3.10	100.0	Granite
12.00	15.00	3.00	GRN	3.00	100.0	2.97	99.0	2.97	99.0	
15.00	18.00	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
18.00	21.00	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
21.00	24.00	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
24.00	27.00	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
27.00	29.20	2.20	GRN	2.20	100.0	2.20	100.0	2.20	100.0	
EOH										

DETAILED GEOTECHNICAL LOG

DRILLHOLE ID: **MPV-04-177c**

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

FROM	TO	ROCK	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of			JOINT CONDITIONS				COMMENT
(m)	(m)	TYPE	STRONG R	WEAK R	% WEAK	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH	Sets	Type	Totals	ANGLE	ROUGH	ALT	FILL	
8.9	12.0	**GRN**	R5			8	0	4	0		0		3	J1	1	15	5	0	9	
														J2	2	45	4	0	9	
														J3	1	55	4	0	9	
12.0	15.0	**GRN**	R5			9		4	0				3	J1	2	70	4	0	3	J1 has silt gouge <1mm thick;
														J2	1	55	4	0	9	
														J3	1	45	4	0	9	
15.0	18.0	**GRN**	R5			7		3	0		0		3	J1	1	80	8	0	9	J1 as trace silt
														J2	1	40	7	0	9	
														J3	1	90	4	0	9	
18.0	21.0	**GRN**	R5			10		2	0		0		2	J1	1	45	1	0	9	
														J2	1	58	4	0	9	
21.0	24.0	**GRN**	R5			6		0	0		0									all fractures interpreted as mechanical
24.0	27.0	**GRN**	R5			7		7	0		0		1	J1	1	75	4	0	9	
27.0	29.2	**GRN**	R5			1		0	0		0									no joints solid core
EOH																				

Photo Record

MPV-04-177c

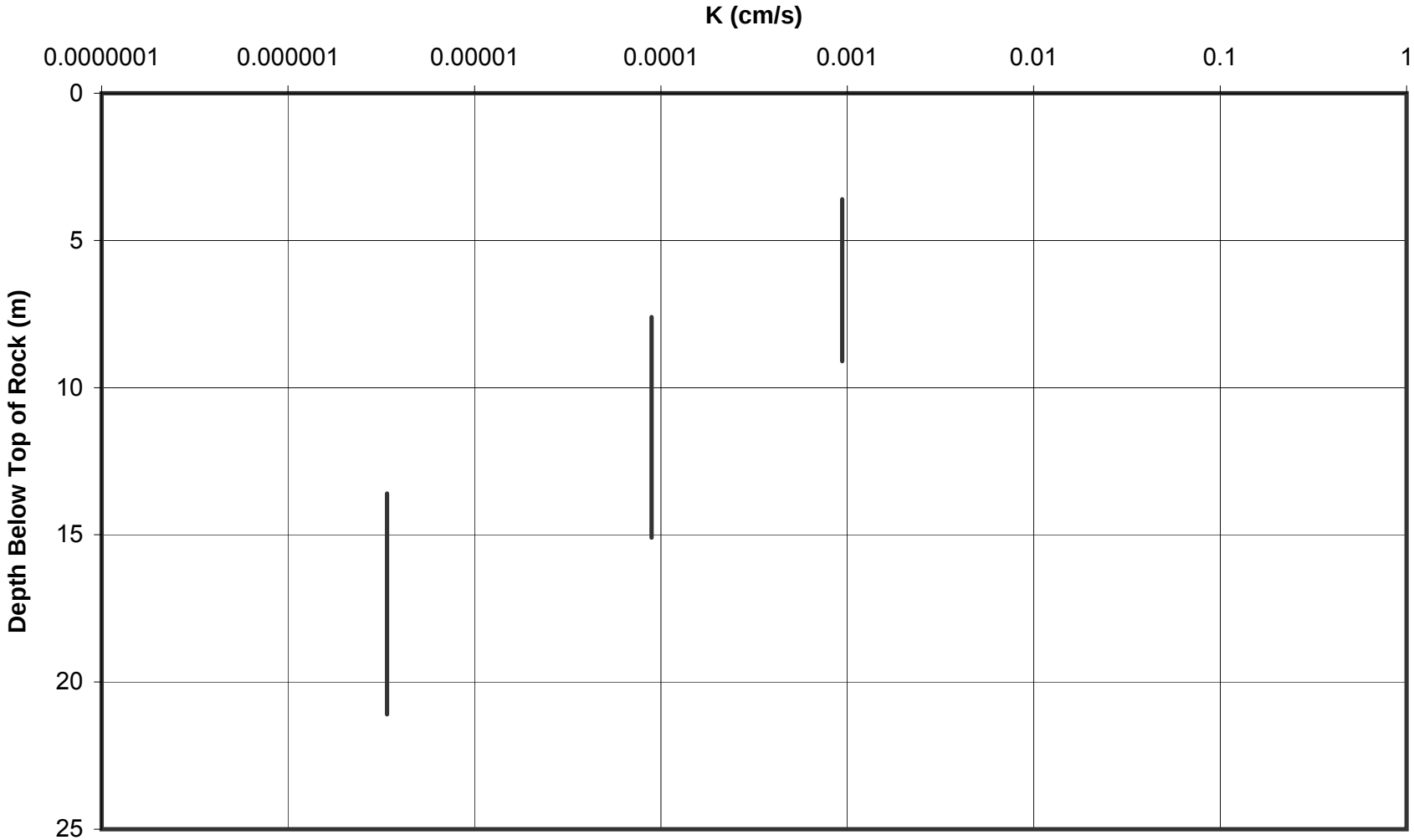
Date	Shift	Filename	Depth (m)	Description
21/3/04	DS 0700-1900	MPV-04-177C_8.1m_Box1_dry	8.1 - 13.7	
21/3/04	DS 0700-1900	MPV-04-177C_13.7m_Box2_dry	13.7 - 19.15	
21/3/04	DS 0700-1900	MPV-04-177C_19.15m_Box3_dry	19.15 - 24.8	
21/3/04	NS 1900-0700	MPV-04-177C_24.8m_Box4_dry	24.8-29.2	

Core Box Record

MPV-04-177c

Box	From	To	Comments
1	8.10	13.70	OVB and granite
2	13.70	19.15	
3	19.15	24.80	
4	24.80	29.20	

Permeability vs Depth
MPV_04_177C



Packer Test Data

Date	21-Mar-04
Staff	R. Bowden Jsiddorn
Init. WL:	0
Ref. Pt.	drill shack floor
Dip	90

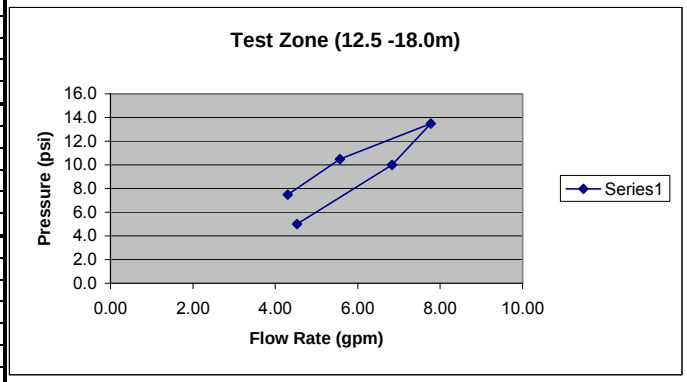
MPV-04-177c

Test 1 12.5 18

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments
1	0	90.30		7.5	no leaks
	1	94.60	4.30		
	2	98.90	4.30		
	3	103.20	4.30		
	4	107.50	4.30	**4.30**	
	5				
2	0	13.50		10.5	no leaks
	1	19.70	6.20		
	2	26.00	6.30		
	3	32.20	6.20		
	4	36.40	4.20	**5.57**	
	5				
	5				
3	0	45.70		13.5	no leaks
	1	53.30	7.60		
	2	60.90	7.60		
	3	68.60	7.70		
	4	76.40	7.80		
	5	84.2	7.80	**7.77**	
4	0	91.30		10.0	no leaks
	1	98.10	6.80		
	2	105.00	6.90		
	3	111.70	6.70		
	4	118.70	7.00		
	5	125.50	6.80	**6.83**	
	6				
5	0	30.90		5.0	no leaks
	1	35.40	4.50		
	2	40.00	4.60		
	3	44.60	4.60		
	4	49.00	4.40		
	5	53.60	4.60	**4.53**	
	6				
	7				
	8				

Summary 12.5 18

Flow rate (gpm)	Pressure (psi)
4.30	7.5
5.57	10.5
7.77	13.5
6.83	10.0
4.53	5.0

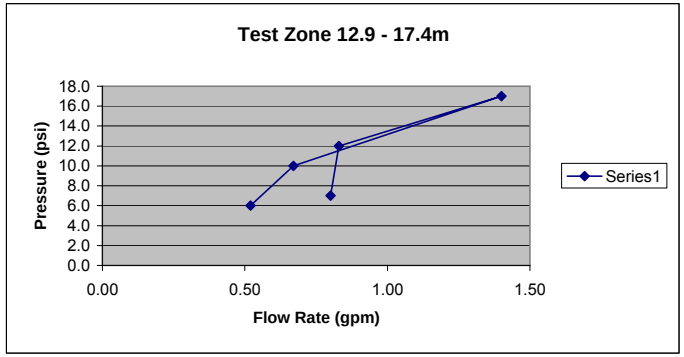


Test 2 16.5 24

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pres (psi)	Comments
1	0	57.00		7.0	
	1	57.70	0.70		
	2	58.40	0.70		
	3	59.15	0.75		
	4	60.00	0.85		
	5	60.80	0.80	**0.80**	
	6				
2	0	3.10		12.0	
	1	4.00	0.90		
	2	4.90	0.90		
	3	5.70	0.80		
	4	6.50	0.80	**0.83**	
3	0	8.10		17.0	
	1	9.45	1.35		
	2	10.90	1.45		
	3	12.50	1.60		
	4	14.10	1.60		
	5	15.40	1.30		
	6	16.70	1.30	**1.40**	
4	0	7.20		10.0	
	1	8.00	0.80		
	2	8.75	0.75		
	3	9.30	0.55		
	4	10.00	0.70		
	5	10.75	0.75	**0.67**	
5	0	1.30		6.0	
	1	1.70	0.40		
	2	2.15	0.45		
	3	2.75	0.60		
	4	3.30	0.55		
	5	3.70	0.40	**0.52**	

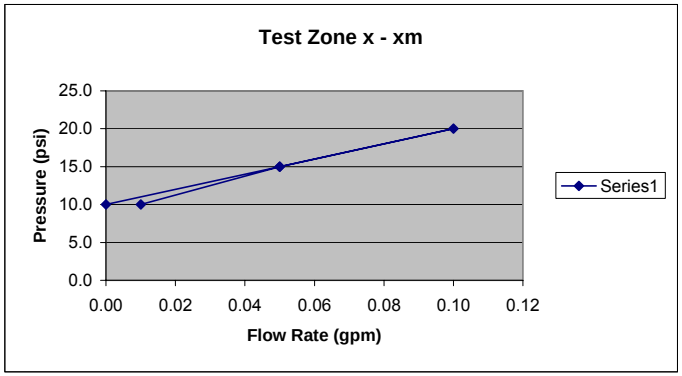
Summary **16.5** **24**

Flow rate (gpm)	Pressure (psi)
0.80	7.0
0.83	12.0
1.40	17.0
0.67	10.0
0.52	6.0



Test 3	22.5	29.2			
Step	**Elapsed time (min)**	**Flow (gal)**	**Flow rate (gpm)**	**Gauge press (psi)**	**Comments**
1	0	9584.85			
	1	9584.86	0.01	10.0	
	2	9584.87	0.01		
	3	9584.88	0.01		
	4	9584.89	0.01		
	5	9584.90	0.01		
2	0	9585.20			
	1	9585.25	0.05	15.0	
	2	9585.30	0.05		
	3	9585.35	0.05		
	4	9585.40	0.05		
3	0	9585.60			
	1	9585.70	0.10	20.0	
	2	9585.80	0.10		
	3	9585.90	0.10		
	4	9586.00	0.10		
4	0	9586.20			
	1	9586.25	0.05	15.0	
	2	9586.30	0.05		
	3	9586.35	0.05		
	4	9586.40	0.05		
5	0	9586.50			
	1	9586.50	0.00	10.0	
	2	9586.50	0.00		
	3	9586.50	0.00		
	4	9586.50	0.00		

Summary	**22.5**	**29.2**
Flow rate (gpm)	Pressure (psi)	
0.01	10.0	
0.05	15.0	
0.10	20.0	
0.05	15.0	
0.00	10.0	



Reflex Readings **MPV-04-177c**

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Field	Temp ©
21.03.04	29.2	261.32	88.4	282.9	5988	5.1

FIELD GEOLOGICAL LOG

HOLE ID **MPV-04-177c**

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	0.60	snow			JS/RB
0.60	1.6	ice			JS/RB
1.60	5.50	water			JS/RB
5.50	8.90	lake sediments		gravel, cobbles, and boulders up to at least 0.7m - see core box.	JS/RB
8.90	29.20	bedrock		Granite:	JS/RB

Permeability Summary

MPV-04-177c

from	to		Step 1	Step 2	Step 3	Step 4	Step 5	Avg K
12.5	18	gauge (psi)	7.5	10.5	13.5	10	5	
		Qavg (igpm)	4.3	5.57	7.77	6.83	4.53	
		K cm/sec	**8.3E-04**	**7.7E-04**	**8.3E-04**	**9.9E-04**	**1.3E-03**	9.4E-04
16.5	24	gauge (psi)	7	12	17	10	6	
		Qavg (igpm)	0.8	0.83	1.4	0.67	0.52	
		K cm/sec	**1.2E-04**	**7.3E-05**	**8.7E-05**	**7.1E-05**	**9.2E-05**	8.9E-05
22.5	30	gauge (psi)	10	15	20	15	10	
		Qavg (igpm)	0.01	0.05	0.1	0.05	0	
		K cm/sec	**1.1E-06**	**3.5E-06**	**5.3E-06**	**3.5E-06**	**0.0E+00**	3.4E-06
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	

Equations:

$Hf = 8.65 \times 10^{-15} (Q^2 * Lp / rp^5)$

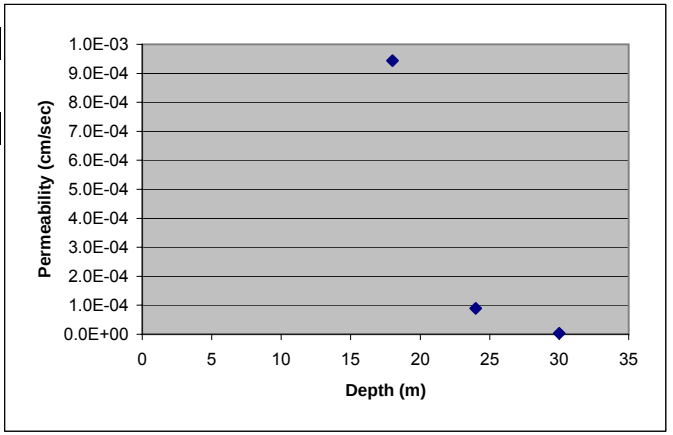
$H_{nit} = (Dw' + Hg - Hf) + Pg/1.42$

$K = (Q * Ln(R/r_b))/2 * \pi * H_{nit} * L)$

Overall **3.5E-04**

assume
- vertical drillhole
- water at ground surface
- height of gauge is at rig flr
- negligible friction losses

Dw	Measured depth of static water (1)	*0*	m
Dp	Measured depth to packer		m
Dt	Depth to midpoint of test		m
Inc	Inclination from horizontal	*90*	m
Dw'	Vertical depth to static water level		°
Dp'	Vertical depth to packer		m
Dt'	Vertical depth to midpoint of test		m
Hg	Gauge height	*0*	m
Lp	Length of discharge pipe		m
rp	Radius of discharge pipe (1" = 0.0127m)		m
R	Radius of influence (10m is standard)	10	m
rb	Drillhole radius (HQ=0.048m, NQ=0.038m)	0.038	m
L	Length of test section		m
Hf		0	m



UCS SAMPLES

HOLE ID: MPV-04-177C

HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-177C	4	27.00-27.32	Granite	04-UCS-177-001

POINT LOAD TEST - INPUT

DRILL HOLE ID: MPV-04-177C

No. #	Tested by	DATE	HOLE/ FACE ID	DIST. (m)	ROCK TYPE	TEST TYPE	ORINT	DAYS	W (mm)	D (mm)	P (kN)	COMMENT
	BAM	04/07/2004	MPV-04-177C	26.90	GRANITE	1	LEFT			47.30	1450.00	GOOD BREAK
	BAM	04/07/2004	MPV-04-177C	26.90	GRANITE	1	LEFT			47.30	1400.00	GOOD BREAK
	BAM	04/07/2004	MPV-04-177C	26.90	GRANITE	1	LEFT			47.30	1150.00	GOOD BREAK
	BAM	04/07/2004	MPV-04-177C	27.40	GRANITE	1	RIGHT			47.30	1400.00	GOOD BREAK
	BAM	04/07/2004	MPV-04-177C	27.40	GRANITE	1	RIGHT			47.30	1500.00	GOOD BREAK
	BAM	04/07/2004	MPV-04-177C	27.40	GRANITE	1	RIGHT			47.30	1150.00	GOOD BREAK

MPV_04_178C


MPV 04 178C
From 3.2
To 8.65
Box 1
DRY

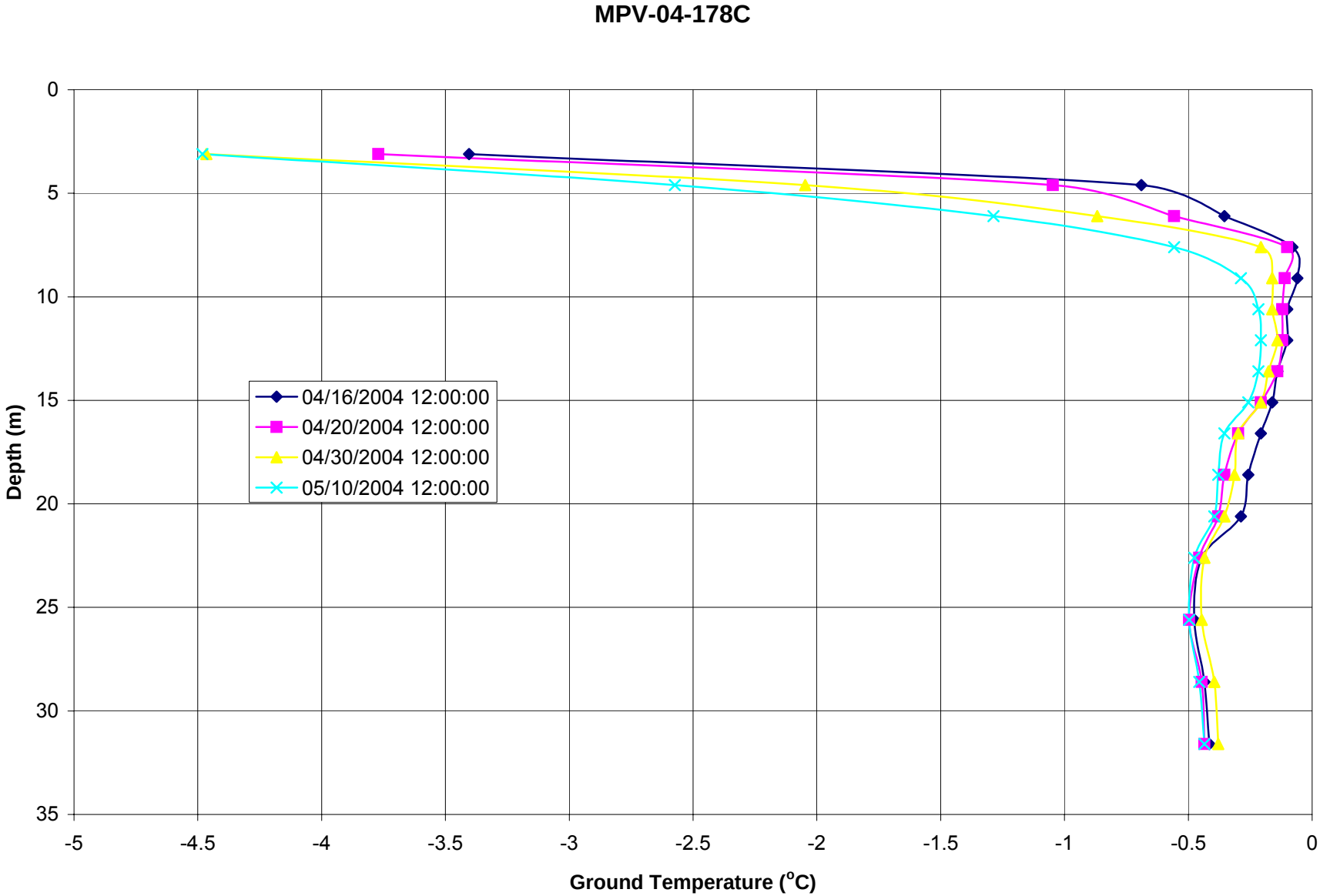

MPV 04 178C
From 8.65
To 13.95
Box 2
DRY


MPV 04 178C
From 13.95
To 19.20
Box 3
DRY


MPV 04 178C
From 19.20m
To 24.65m
Box 4
DRY


MPV 04 178C
From 24.65m
To 29.65m
Box 5
DRY


MPV 04 178C
From 29.65m
To 31.65m
Box 6
DRY


MPV-04-178C
Depth (m)
0
5
10
15
20
25
30
35
-5
-4.5
-4
-3.5
-3
-2.5
-2
-1.5
-1
-0.5
0
Ground Temperature (°C)
04/16/2004 12:00:00
04/20/2004 12:00:00
04/30/2004 12:00:00
05/10/2004 12:00:00

Diary

MPV-04-178c

target depth is 31.6m

PVC length should be approx. 31.9m; each length is 5.975m

protective casing id is larger than drillhole casing id so it may be impossible to install

DS 22/03/2004

rig floor = 0.0m Depths to top of ...
ground surface = 1.6m
bedrock = 1.7m
casing set at 3.2m (3m casing + 0.2 ft below rig floor)

1400	at 5.65m
1445	at 8.65m
1520	at 11.65m
1640	at 17.65m
1730	at 20.65m
1820	at 23.65m

NS 22/03/2004

1900	refill hydraulic oil
2000	bit change
	had to ream hole
2145	resume drilling
1030	at 26.65
1115	at 29.65
0000	at 31.6 EOH
0030	Reflex
0200	installed thermistor; no protective pipe
0400	white out called

DS 23/03/2004

1700	white out cancelled
1800	moved off drillhole and staked

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FIELD DRILL PERFORMANCE LOG

PROJECT	**Gahcho Kue Geotech**
PROJECT NO	**2CD002.11**
NORTHING	7036884.99
EASTING	590216.8
SURFACE ELEVATION	405.86
AZIMUTH	230
DIP	70

HOLE NO:	**MPV-04-178c**
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	1100 March 22, 2004
FINISH DATE AND TIME	0300 March 23, 2004
HOLE DIAMETER	47.6 (NQ)
DRILLING METHOD	Diamond core

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
DS 0700-1900	R Bowden	03/22/2004	1830	12	5	20.7	set-up, hoses	20.7	7	2.96	12	5	7	2.96
NS 1900-0700	J Siddorn	03/22/2004	0630	8	5	31.60	refill hydraulic oil, change bit, install therr	10.9	3	3.63	20	10	10	3.16

OVERALL HOLE DRILL RATE (m/hr)	1.58
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	3.16

GENERAL GEOTECH LOG

DRILLHOLE ID: **MPV-04-178c**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
		0.00								
3.20	5.65	2.45	GRN	2.45	100.0	2.34	95.5	2.24	91.4	2.5cm Silt/Clay seam at 4.97m
5.65	8.65	3.00	GRN	3.00	100.0	2.78	92.7	2.38	79.3	
8.65	11.65	3.00	GRN	3.00	100.0	2.93	97.7	2.56	85.3	
11.65	14.65	3.00	GRN	3.00	100.0	2.41	80.3	2.11	70.3	
14.65	17.65	3.00	GRN	3.00	100.0	2.87	95.7	1.77	59.0	
17.65	20.65	3.00	GRN	3.00	100.0	2.90	96.7	2.75	91.7	
20.65	23.65	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
23.65	26.65	3.00	GRN	3.00	100.0	2.98	99.3	2.82	94.0	
26.65	29.65	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	

DETAILED GEOTECHNICAL LOG

DRILLHOLE ID: **MPV-04-178c**

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

FROM	TO	ROCK	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of			JOINT CONDITIONS				COMMENT
(m)	(m)	TYPE	STRONG R	WEAK R	% WEAK	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH	Sets	Type	Totals	ANGLE	ROUGH	ALT	FILL	
3.20	5.65	**GRN**	R5			16	0	7	0		0		3	J1	1	32	5	0	8	J1 has 2.5cm silt/clay gouge seam; J2 has light silt coating; remaining joints are rough, weathered and have no filling
														J2	1	70	4	0	3	
														J3	2	35	4	0	9	
5.65	8.65	**GRN**	R5			21	0	19	0		1	0	3	J1	1	15	4	0	3	J1 has friable detacable carbonate coating
														J2	6	65	1	0	9	
														J3	5	50	4	0	9	
8.65	11.65	**GRN**	R5			17	0	10	0		0		3	J1	1	57	4	0	7	J1 has sand/silt gouge; J3 has carbonate caoting on joints at angles of 5, 20, 26, and 45
														J2	2	20	9	0	9	
														J3	4		4	0	3	
11.65	14.65	**GRN**	R5			22	0	21	0		0		3	J1	3	57	6	0	9	Most joints have black/weathered surfaces
														J2	5	25	3	0	9	
														J3	6	40	1	0	9	
14.65	17.65	**GRN**	R5			28	0	27	0		0		3	J1	1	68	9	0	9	J3 has angles of 57 and 82; Approx 1/3 of remaining joints have rougness of 1, and 2/3 have roughness of 4and5. All joints have black/weathered surfaces.
														J2	2	34	6	0	9	
														J3	2		3	0	9	
17.65	20.65	**GRN**	R5			22	0	13	0		1	0	3	J1	1	45	6	0	9	
														J2	1	75	6	0	9	
														J3	2	45	7	0	9	
20.65	23.65	**GRN**	R5			13	0	9	0		0		3	J1	1	20	4	0	9	
														J2	3	30	6	0	9	
														J3	5	45	4	0	9	
23.65	26.65	**GRN**	R5			14	0	7	0		1	0	3	J1	4	45	6	0	2	carbonate in J1
														J2	1	90	5	0	9	
														J3	2	30	5	0	9	
26.65	29.65	**GRN**	R5			8	0	2	0		0		1	J1	2	85	5	0	9	
29.65	31.60	**GRN**	R5			5	0	1	0		0		1	J1	1	85	5	0	9	
EOH																				

Photo Record

MPV-04-178c

Date	Shift	Filename	Depth	Description
22-Mar-04	DS 0700-1900	MPV-04-178C_3.20m_Box1_dry	3.2 - 8.65	Granite
22-Mar-04	DS 0700-1900	MPV-04-178C_8.65m_Box2_dry	8.65 - 13.95	
22-Mar-04	DS 0700-1900	MPV-04-178C_13.95m_Box3_dry	13.95 - 19.20	
22-Mar-04	NS 1900-0700	MPV-04-178C_19.2m_Box4_dry	19.2-24.65	
22-Mar-04	NS 1900-0700	MPV-04-178C_24.65m_Box5_dry	24.65-29.65	
22-Mar-04	NS 1900-0700	MPV-04-178C_29.65m_Box6_dry	29.65-31.6	

Core Box Record

MPV-04-178c

Box	From	To	Comments
1	3.20	8.65	
2	8.65	13.95	
3	13.95	19.20	
4	19.20	24.65	
5	24.65	29.65	
6	29.65	31.60	

Reflex Readings **MPV-04-178c**

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Field	Temp ©
23.03.04	33m	217.3	69.7	122.6	5972	11.5

Thermistor Readings

MPV-04-178c

Thermistor String ID: **32/16 - 20**

Thermis Node	Reading (kOhms)	Comments
1	6.11	all channels active before installation
2	6.69	
3	6.98	
4	7.28	
5	6.45	
6	6.76	
7	7.31	
8	6.81	
9	6.49	
10	6.58	
11	7.20	
12	7.00	
13	5.99	
14	6.52	
15	5.80	
16	6.10	

FIELD GEOLOGICAL LOG

HOLE ID **MPV-04-178c**

From (m)	To (m)	Material	Xeno. Content (%)	Description	Logged By
0	1.6	snow	0		JS/RB
1.6	1.7	soil	0	overburden	JS/RB
1.7	31.6	granite	0		JS/RB

UCS SAMPLE LIST				
HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-178C	6	30.10	GRANITE	04-UCS-178-001

POINT LOAD TEST - INPUT

DRILL HOLE ID: MPV-04-178C

No. #	Tested by	DATE	HOLE/ FACE ID	DIST. (m)	ROCK TYPE	TEST TYPE	ORINT	DAYS	W (mm)	D (mm)	P (PSI)	COMMENT
	BAM	04/08/2004	MPV-04-178C	29.80	GRANITE	1	LEFT			47.75	1650.00	GOOD TEST
	BAM	04/08/2004	MPV-04-178C	29.80	GRANITE	1	LEFT			47.75	1910.00	GOOD TEST
	BAM	04/08/2004	MPV-04-178C	29.80	GRANITE	1	LEFT			47.75	1550.00	GOOD TEST
	BAM	04/08/2004	MPV-04-178C	30.60	GRANITE	1	RIGHT			47.75	1430.00	GOOD TEST
	BAM	04/08/2004	MPV-04-178C	30.60	GRANITE	1	RIGHT			47.75	1550.00	GOOD TEST
	BAM	04/08/2004	MPV-04-178C	30.60	GRANITE	1	RIGHT			47.75	1400.00	GOOD TEST

MPV_04_179C

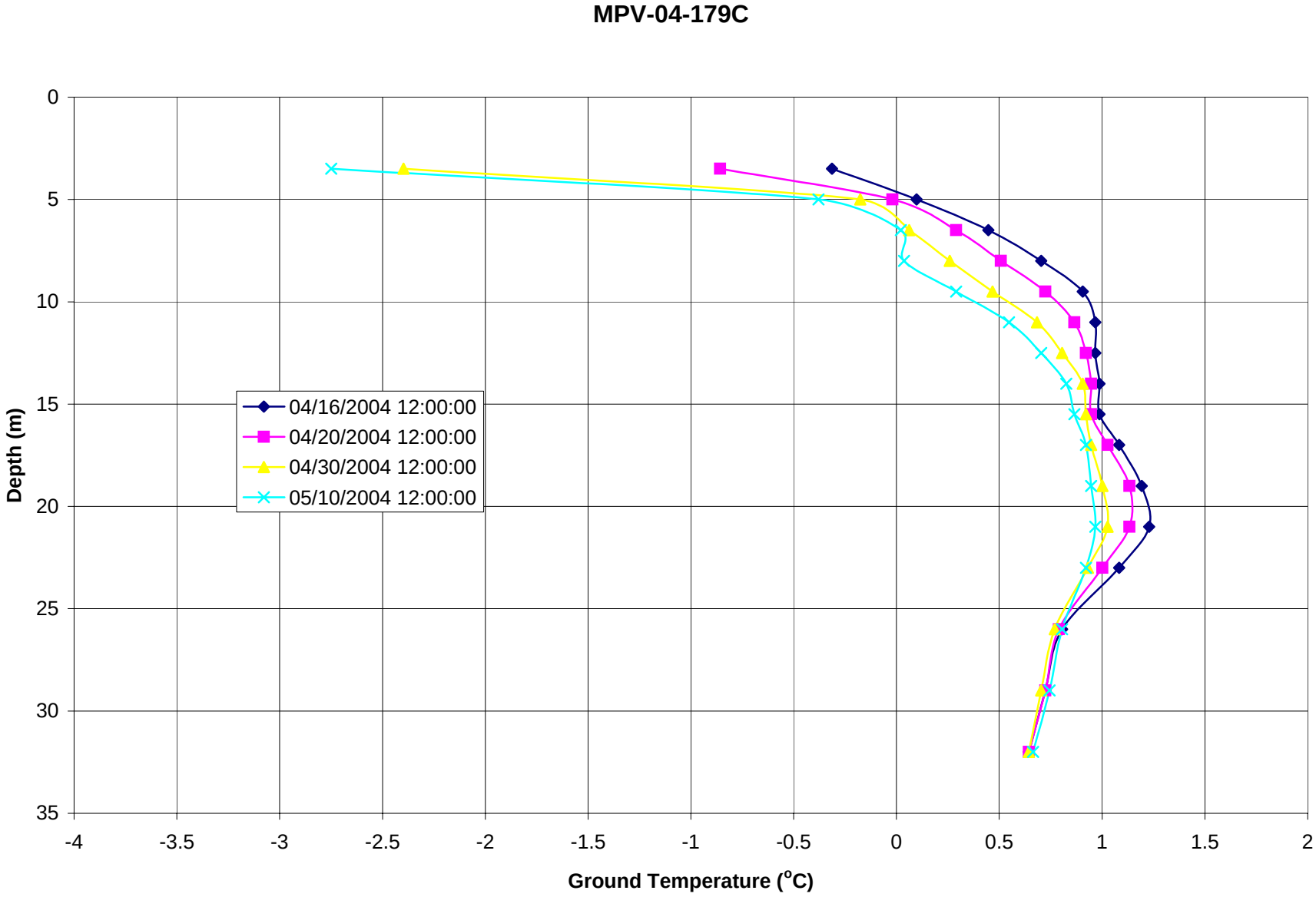

From: 3.9
To: 9.0
Box 1
DRY


From: 9.0
To: 14.5
Box 2
DRY


From: 14.5
To: 20.1
Box 3
DRY


From: 20.1
To: 25.7
Box 4
DRY


From: 25.9
To: 32.0
Box 5&6
DRY


MPV-04-179C
Depth (m)
0
5
10
15
20
25
30
35
-4
-3.5
-3
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Ground Temperature (°C)
04/16/2004 12:00:00
04/20/2004 12:00:00
04/30/2004 12:00:00
05/10/2004 12:00:00

Diary MPV-04-179c

NS 23/03/2004 **Target depth is 31.8m**

rig floor = 0.0m **Depths to top of ...**
ice = 0.8m
ground = 1.8
bedrock = 2.65m

0130	casing set at 2.75m
0200	need new NQ stabiliser
0230	begin drilling
0330	at 6m
	core stuck in hole, need to retrieve
	core blocking, hard drilling
0400	engine quit, battery discharged, need to boost
0500	back to drilling
	core very poor, blocking (not entering core tube)
0600	8m

DS 24/03/2004

0730	changed bit
0810	at 9m
0850	at 12m
0930	at 15m
1012	at 18m
	very cold in drill rig; stopped to tie tarp on
1110	at 21m
1230	at 24m
1300	at 27m
	bit dead at 28.5m; severe problems pulling last 2 rods;
	eventually redrilled rods to
	reamed casing to 9m
	ISO visit
	rods frozen; probably due to loss of circulation above 8m
	while reaming casing
	starting to ream below 9m to free rods

NS 24/03/2004

1900	Reaming casing, need to ream casing to 24.5m
0300	had to change shoe bit twice, still reaming casing
0600	casing at 21m
0900	casing at 25m - rods free
1015	started drilling
1050	at 27m
1200	at 30m
1230	32.0m
1300	thermistor installed
	no protective pipe
	staked

SRK Consulting
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FIELD DRILL PERFORMANCE LOG

PROJECT	**Gahcho Kue Geotech**
PROJECT NO	**2CD002.11**
NORTHING	7036871.71
EASTING	590200.73
SURFACE ELEVATION	404.71
AZIMUTH	230
DIP	70

HOLE NO:	**MPV-04-179c**
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	2350 23.03.04
FINISH DATE AND TIME	1300 March 25, 2004
HOLE DIAMETER	47.6 (NQ)
DRILLING METHOD	Diamond core

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
NS 1900-0700	J Siddorn	23.03.04	0630	8	3.5	8	install water line, setup, flat battery	8	4.5	1.78	8	3.5	4.5	1.78
DS 0700-1900	R Bowden	24.03.04	1830	12	1	25.00	tools/equip from site	17	11	1.55	20	4.5	15.5	1.61
NS 1900-0700	J Siddorn	24.03.04	0630	12	10		reamed casing		2	-12.50	32	14.5	17.5	0.00
DS 0700-1900	R Bowden	25.03.04	1830	7	1	32.00	installed termistor	32	6	5.33	39	15.5	23.5	1.36

OVERALL HOLE DRILL RATE (m/hr)	1.46
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	2.43

GENERAL GEOTECH LOG

DRILLHOLE ID: **MPV-04-179c**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
0.00	0.80	0.80	Air							
0.80	1.80	1.00	Ice							
1.80	2.65	0.85	Till							
2.65	6.00	3.35	GRN	2.10	62.7	0.67	20.0	0.62	18.5	**half of run looks like gravel**
6.00	9.00	3.00	GRN	3.00	100.0	2.10	70.0	1.02	34.0	
9.00	12.00	3.00	GRN	3.00	100.0	2.77	92.3	2.58	86.0	Granite
12.00	15.00	3.00	GRN	3.00	100.0	2.96	98.7	2.96	98.7	Granite
15.00	18.00	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	pagmatitic sections
18.00	21.00	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
21.00	24.00	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
24.00	24.80	0.80	GRN	0.80	100.0	0.80	100.0	0.80	100.0	short run to change bit
24.80	27.00	2.20	GRN	2.20	100.0	2.20	100.0	2.20	100.0	
27.00	30.00	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
30.00	32.00	2.00	GRN	2.00	100.0	2.00	100.0	2.00	100.0	End of Hole

DETAILED GEOTECHNICAL LOG

DRILLHOLE ID: **MPV-04-179c**

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

FROM (m)	TO (m)	ROCK TYPE	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of Sets	Type	Totals	JOINT CONDITIONS				COMMENT
			STRONG R	WEAK R	% WEAK	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH				ANGLE	ROUGH	ALT	FILL	
0.0	0.8	Air																		
0.8	1.8	ICE																		
1.8	2.7	TILL																		
2.7	6.0	GRN	R5			50	0	30	0		0		3	J1	25		2	0	9	Half of run looks like gravel with weathered surfaces of roughness 1, 2 or 4 - lumped together as J1, wit various angles; J3 as anlges of 45, 55, and 84 - all weathered/staining
														J2	1	37	7	0	9	
														J3	3		5	0	9	
6.0	9.0	GRN	R5			50	0	30	0		0		3	J1	2	47	6	0	9	Vast majority of joints are weathered, have variable joint angles and roughness of 1, 2, and 4. Interpreted to be frost satter; trace silt on a few joints; blakc staining typical
														J2	2	40	7	0	9	
														J3	1	5	3	0	9	
9.0	12.0	GRN	R5			24	0	14	0		0		3	J1	1	87	4	0	6	J1 and J2 gas thin silt coating; J3 are weathered; most of remaining joints are darkly stained
														J2	1	35	1	0	6	
														J3	4	53	5	0	9	
12.0	15.0	GRN	R5			5	0	4	0		0		3	J1	1	45	9	0	6	
														J2	1	45	3	0	9	
														J3	1	45	2	0	9	
15.0	18.0	GRN	R5			8	0	1	0		0		1	J1	1	30	1	0	9	
18.0	21.0	GRN	R5			14	0	1	0		0		1	J1	1	37	1	0	9	
21.0	24.0	GRN	R5			13	0	0	0		0									no natural joints

Photo Record

MPV-04-179c

Date	Shift	Filename	Depth	Description
24/03/2004	DS 0700-1900	MPV-04-179C_3.9m_Box1_dry	3.9 - 9.0	Box 1
24/03/2004	DS 0700-1900	MPV-04-179C_9.0m_Box2_dry	9.0 - 14.5	2
24/03/2004	DS 0700-1900	MPV-04-179C_14.5m_Box3_dry	14.5 - 20.1	3
25/03/2004	DS 0700-1900	MPV-04-179C_20.1m_Box4_dry	20.1 - 25.7	4
25/03/2004	DS 0700-1900	MPV-04-179C_25.3m_Boxes5and6_dry	25.7 - 32.0	Boxes 5 and 6

Core Box Record

MPV-04-179c

Box	From	To	Comments
1	3.90	9.00	
2	9.00	14.50	
3	14.50	20.10	
4	20.10	25.70	
5	25.70	31.20	
6	31.20	32.00	**EOH**

Reflex Readings **MPV-04-179c**

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Field	Temp ©
25.03.04	32	216.2	70.3		6057	14.9

Thermistor Readings

MPV-04-179c

Thermistor String ID: **32/16 - 19**

Thermis Node	Reading (kOhms)	Comments
1		all channels active before installation
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		

FIELD GEOLOGICAL LOG

HOLE ID **MPV-04-179c**

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	0.8	Air			JS
0.80	1.80	ICE			JS
1.80	2.65	TILL		Gravel. Sand	JS
2.65	32.00	Granite		Granite; occasionally pegmatitic and biotitic; massive to highly fractured;	RB

UCS SAMPLES

HOLE ID: MPV-04-179C

HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-179C	5	29.27	Granite	04-UCS-179-001

POINT LOAD TEST - INPUT

DRILL HOLE ID: MPV-04-179C

No. #	Tested by	DATE	HOLE/ FACE ID	DIST. (m)	ROCK TYPE	TEST TYPE	ORINT	DAYS	W (mm)	D (mm)	P (kN)	COMMENT	
	BAM	04/07/2004	MPV-04-179C	29.17	GRANITE	1	LEFT			47.54	1450.00	GOOD BREAK	
	BAM	04/07/2004	MPV-04-179C	29.17	GRANITE	1	LEFT			47.54	1200.00	FAIR BREAK	
	BAM	04/07/2004	MPV-04-179C	29.17	GRANITE	1	LEFT			47.54	2350.00	FAIR BREAK	
	BAM	04/07/2004	MPV-04-179C	29.80	GRANITE	1	RIGHT			47.54	1175.00	GOOD BREAK	VERY CRYSTALINE
	BAM	04/07/2004	MPV-04-179C	29.80	GRANITE	1	RIGHT			47.54	1250.00	GOOD BREAK	VERY CRYSTALINE
	BAM	04/07/2004	MPV-04-179C	29.80	GRANITE	1	RIGHT			47.54	980.00	FAIR BREAK	VERY CRYSTALINE

MPV_04_182C


From 15.0m
To: 21.0m
Box 1
WET


From 21.0m
To: 26.6m
Box 2
DRY
21m
26m


From 26.6m
To: 32.0
Box 3
dry
27m
32m


From 32.0
To: 35.0
Box 4
dry


21m
2004 03 26

Diary

MPV-04-182c

NS 25/03/2004	**Target depth is 36m**
	rig floor = 0.0m Depths to top of ...
	ice = 0.6m
	water = 2m
	till = 10m
	bedrock = 15m
1900	casing
2130	casing set to 15.3m
1030	begin drilling
1040	stop to add calcium as core tube (lifter) was freezing
1110	resume drilling
1200	at 18m
1200	core tube not locking need to pull rods to check bit
1215	engine failed to start replace starter motor on engine
0200	resume drilling
0345	at 24m
0400	first packer test 19.5-24m
0445	resume drilling
0500	at 27m
0615	at 30m
DS 26/03/2004	
0730	
	packer test #2 completed; slush around seating cone; flow through
0800	feed hose to stuffing box confirmed
0915	at 32m - (1m stick up)
	additional packer test (#3) at 22.5 - 32m; post-test, confirmed flow through feed hose to stuffing box and flow through packer water
1030	pipe
1200	packer at 25.5 - 35.0m completed
	reflex
	grouted
	staked
	rig lub'ed
1400	moved to D5-A-1T

SRK Consulting
Engineers and Scientists

FIELD DRILL PERFORMANCE LOG

PROJECT	**Gahcho Kue Geotech**
PROJECT NO	**2CD002.11**
NORTHING	7036601.9
EASTING	589877.67
SURFACE ELEVATION	404.44
AZIMUTH	0
DIP	90

HOLE NO:	**MPV-04-182c**
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	25.03.04 1900
FINISH DATE AND TIME	26.03.04 1600
HOLE DIAMETER	47.6 (NQ)
DRILLING METHOD	Diamond core

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
NS 1900-0700	J Siddorn	25.03.04	0630	12	4.5	30	starter motor replaced, packer tests, repa	30	7.5	4.00	12	4.5	7.5	4.00
DS 0700-1900	R Bowden	26.03.04	1830	12	7	35.00	packers, reflex, grouted	5	5	1.00	24	11.5	12.5	2.80

OVERALL HOLE DRILL RATE (m/hr)	1.46
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	2.80

GENERAL GEOTECH LOG

DRILLHOLE ID: **MPV-04-182c**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
0.00	0.60	0.60	AIR							rig floor to ice
0.60	2.00	1.40	ICE							
2.00	10.00	8.00	Water							
10.00	15.00	5.00	TILL							at least two boulders in till, granite and amphibolite
15.00	18.00	3.00	DIA	3.00	100.0	3.00	100.0	2.80	93.3	diabase dyke (dolerite)
18.00	21.00	3.00	DIA	3.00	100.0	2.80	93.3	2.54	84.7	diabase dyke (dolerite)
21.00	24.00	3.00	DIA	3.00	100.0	3.00	100.0	2.96	98.7	diabase dyke (dolerite)
24.00	27.00	3.00	DIA	3.00	100.0	2.97	99.0	2.97	99.0	diabase dyke (dolerite)
27.00	30.00	3.00	DIA	3.00	100.0	3.00	100.0	3.00	100.0	diabase dyke (dolerite)
30.00	32.00	2.00	DIA	2.00	100.0	1.97	98.5	1.89	94.5	
32.00	35.00	3.00	DIA	3.00	100.0	2.30	100.0	2.21	96.0	*SCR and RQD bsed on 2.3m recovery; bottom 0.7m slipped from core tube during pulling and was recovered after packer testing; broken condition likely does not reflect actual ground condition*

DETAILED GEOTECHNICAL LOG

DRILLHOLE ID: **MPV-04-182c**

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

FROM	TO	ROCK	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of			JOINT CONDITIONS				COMMENT
(m)	(m)	TYPE	STRONG R	WEAK R	% WEAK	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH	Sets	Type	Totals	ANGLE	ROUGH	ALT	FILL	
0.0	0.6	Air																		
0.6	2.0	ICE																		
2.0	10.0	Water																		
10.0	15.0	TILL																		
15.0	18.0	DIA	R4		0	13	0	8	0	0	0	0	2	J1	3	20	5	0	9	
														J2	5	70	5	0	9	
18.0	21.0	DIA	R4		0	21	0	17	0	0	0	0	3	J1	2	10	5	0	9	chlorite in J3, iron staining in J2
														J2	9	45	5	0	9	
														J3	6	30	5	0	9	
21.0	24.0	DIA	R4		0	16	0	12	1	1	0	0	2	J1	7	60	2	0	9	chlorite in J2 and in cemented joint
														J2	5	30	6	0	9	
														J3	1	20	4	0	9	
24.0	27.0	DIA	R4		0	9	0	7	2	1	0	0	3	J1	2	45	5	0	9	chlorite in J2
														J2	2	70	5	0	5	
														J3	3	20	2	0	9	
27.0	30.0	DIA	R4		0	11	0	7	2	1	0	0	2	J1	4	60	9	0	9	chlorite in cemented joint
														J2	3	25	5	0	9	
30.0	32.0	DIA	R4		0	12	0	9	2	1	0	0	3	J1	1	42	5	0	8	**J1 has thick soft gouge**; most of remaining joints have joint fill type '6'
														J2	1	25	3	0	6	
														J3	2	40	4	0	6	
32.0	33.0	DIA	R4		0	10	0	9	1	1	0	0	3	J1	5	20	5	0	6	J2 has angles of 73 and 83; Core from 34.3m to 35.0m slipped from core barrel; recovered after packer test; broken condition probably does not reflect actual ground conditions, so excluded from assessment
														J2	2		5	0	3	
														J3	1	62	4	0	6	
EOH																				

Photo Record

MPV-04-182c

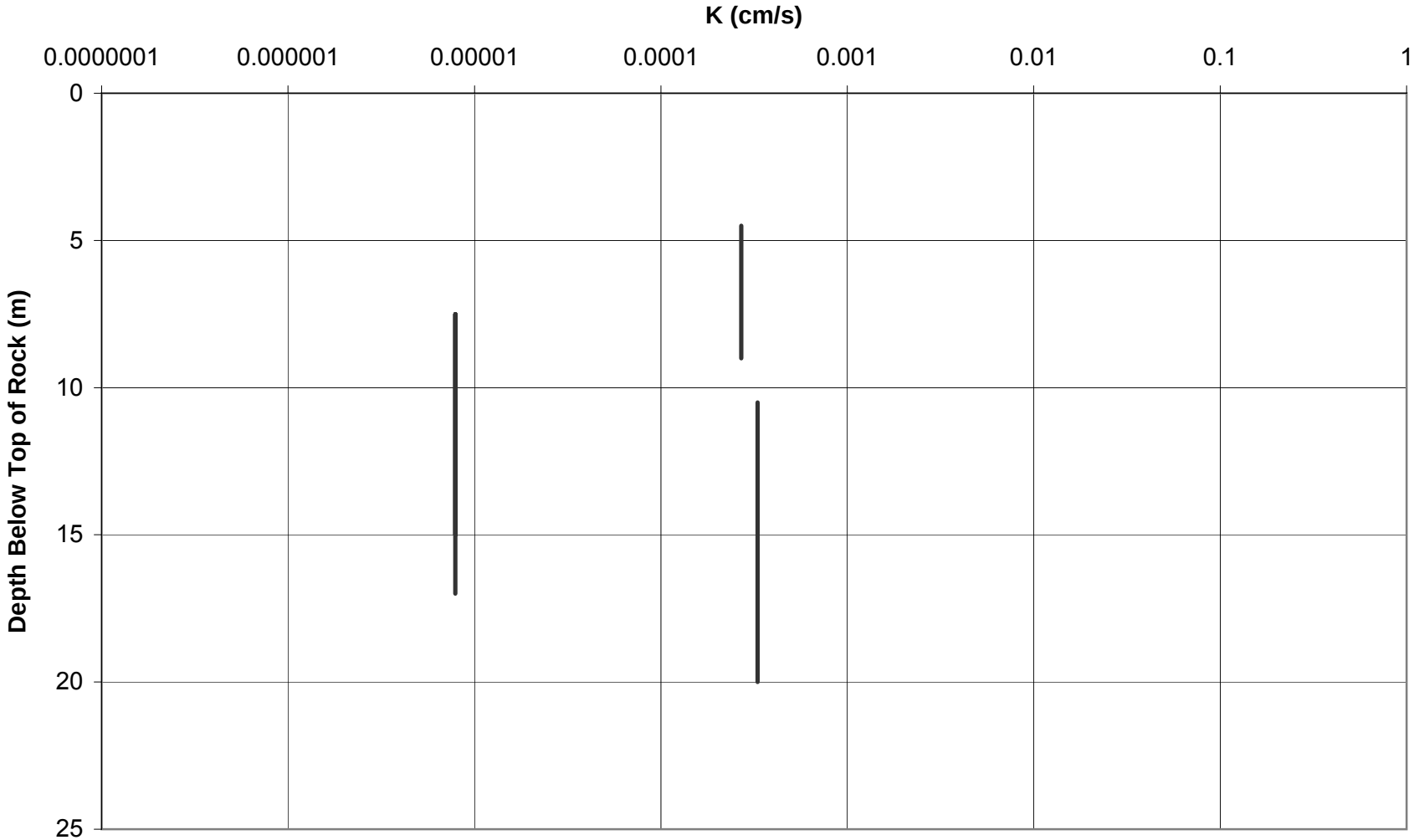
Date	Shift	Filename	Depth	Description
25.03.04	NS 1900-0700	MPV-04-182C_15m_Box1_wet	15-21m	diabase core
25.03.04	NS 1900-0700	MPV-04-182C_at22.5m_chloritic_cemented_joint_wet	22.5m	chloritic cemented joint in diabase
25.03.04	NS 1900-0700	MPV-04-182C_21m_Box2_wet	21-26.6m	diabase core
26.03.04	DS 0700-1900	MPV-04-182C_26.6m_Box3_dry	26.6 - 32.0	
26.03.04	DS 0700-1900	MPV-04-182C_32.0m_Box4_dry	32.0 - 35.0	

Core Box Record

MPV-04-182c

Box	From	To	Comments
1	15.00	21.00	
2	21.00	26.60	
3	26.60	32.00	
4	32.00	35.00	EOH

Permeability vs Depth
MPV_03_182C



Packer Test Data

Date	22-Feb-04
Staff	J SIDDORN
Init. WL:	0
Ref. Pt.	drill shack floor
Dip	90

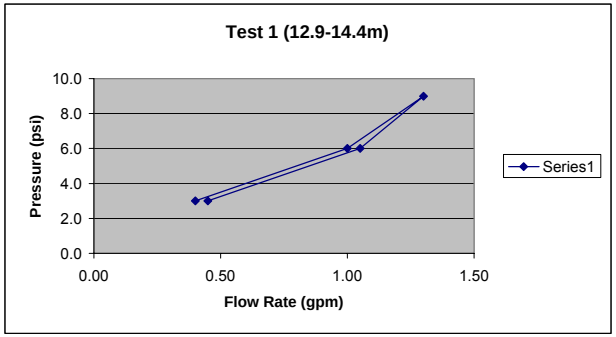
MPV-04-182c

Test 1 19.5 24

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments
1	0	9588.00			no leaks
	1	9588.45	0.45		
	2	9588.90	0.45		
	3	9589.35	0.45		
	4	9589.80	0.45		
				0.45	
2	0	9591.00			no leaks
	1	9592.05	1.05		
	2	9593.10	1.05		
	3	9594.15	1.05		
	4	9595.20	1.05		
				1.05	
3	0	9596.00			no leaks
	1	9597.40	1.40		
	2	9598.75	1.35		
	3	9600.05	1.30		
	4	9601.35	1.30		
	5	9602.65	1.30	1.30	
4	0	9603.00			no leaks
	1	9603.85	0.85		
	2	9604.80	0.95		
	3	9605.80	1.00		
	4	9606.80	1.00		
	5	9607.80	1.00		
				1.00	
5	0	9607.60			no leaks
	1	9608.00	0.40		
	2	9608.40	0.40		
	3	9608.80	0.40		
	4	9609.20	0.40		
				0.40	

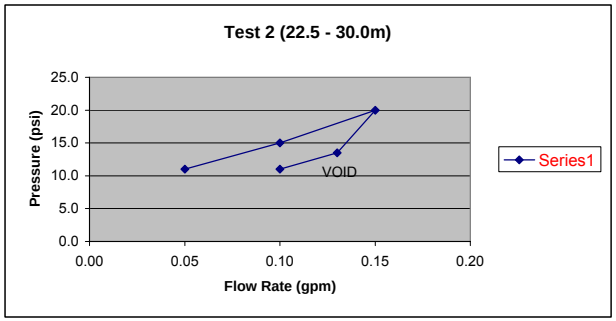
Summary 19.5 24

Flow rate (gpm)	Pressure (psi)
0.45	3.0
1.05	6.0
1.30	9.0
1.00	6.0
0.40	3.0



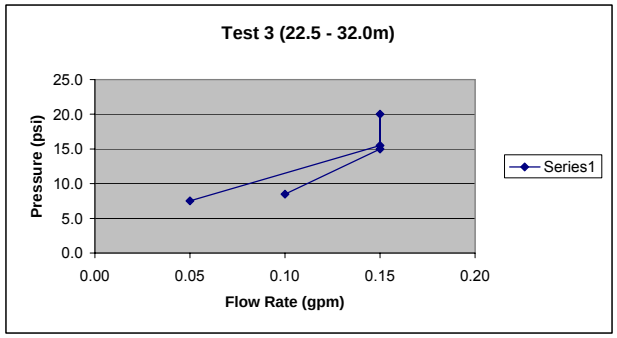
Test 2	22.5	30			
Step	**Elapsed time (min)**	**Flow (gal)**	**Flow rate (gpm)**	**Gauge press (psi)**	**Comments**
1	0	10.60		11.0	
	1	10.75	0.15		
	2	10.90	0.15		
	3	11.00	0.10		
	4	11.10	0.10		
	5	11.20	0.10		
	6			**0.10**	
2	0	11.40		13.5	
	1	11.50	0.10		
	2	11.75	0.25		
	3	11.80	0.05		
	4	11.85	0.05		
	5	12.00	0.15		
	6	12.10	0.10		
	7	12.30	0.20	**0.13**	
3	0	12.80		20.0	
	1	13.00	0.20		
	2	13.15	0.15		
	3	13.35	0.20		
	4	13.50	0.15		
	5	13.60	0.10		
	6	13.75	0.15		
	7	13.90	0.15		
	8			**0.15**	
4	0	14.05		15.0	
	1	14.15	0.10		
	2	14.30	0.15		
	3	14.40	0.10		
	4	14.50	0.10		
	5	14.60	0.10	**0.10**	
5	0	14.65		11.0	
	1	14.65	0.00		
	2	14.65	0.00		
	3	14.70	0.05		
	4	14.75	0.05		
	5	14.85	0.10		
	6	14.90	0.05	**0.05**	
	7				

Summary	**22.5**	**30**
Flow rate (gpm)	Pressure (psi)	
0.10	11.0	
0.13	13.5	
0.15	20.0	
0.10	15.0	
0.05	11.0	



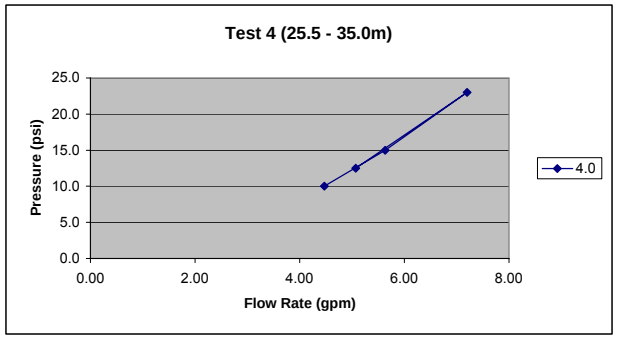
Test 3	22.5	32			
Step	**Elapsed time (min)**	**Flow (gal)**	**Flow rate (gpm)**	**Gauge press (psi)**	**Comments**
1	0	4.80		8.5	
	1	4.90	0.10		
	2	5.00	0.10		
	3	5.10	0.10		
	4	5.20	0.10	**0.10**	
	5				
2	0	5.65		15.0	
	1	5.80	0.15		
	2	5.95	0.15		
	3	6.10	0.15		
	3	6.25	0.15	**0.15**	
	4				
	5				
3	0	6.60		20.0	
	1	6.80	0.20		
	2	7.10	0.30		
	3	7.35	0.25		
	4	7.50	0.15		
	5	7.65	0.15		
	6	7.80	0.15		
	7	7.95	0.15	**0.15**	
	8				
	9				
4	0	8.00		15.5	
	1	8.15	0.15		
	2	8.30	0.15		
	3	8.45	0.15		
	4	8.60	0.15	**0.15**	
	5				
5	0	8.60		7.5	
	1	8.65	0.05		
	2	8.70	0.05		
	3	8.75	0.05		
	4	8.80	0.05	**0.05**	
	5				

Summary	**22.5**	**32**
Flow rate (gpm)	Pressure (psi)	
0.10	8.5	
0.15	15.0	
0.15	20.0	
0.15	15.5	
0.05	7.5	



Test 3	25.5	35			
Step	**Elapsed time (min)**	**Flow (gal)**	**Flow rate (gpm)**	**Gauge press (psi)**	**Comments**
1	0	27.20		4.0	
	1	28.90	1.70		
	2	30.60	1.70		
	3	32.40	1.80	**1.73**	
	4				
	5				
2	0	36.50		12.5	
	1	41.60	5.10		
	2	46.70	5.10		
	3	51.70	5.00	**5.07**	
	4				
3	0	60.60		23.0	
	1	67.70	7.10		
	2	75.00	7.30		
	3	82.10	7.10		
	4	89.30	7.20	**7.20**	
	5				
4	0	1.10		15.0	
	1	6.70	5.60		
	2	12.30	5.60		
	3	17.90	5.60		
	4	23.60	5.70	**5.63**	
	5				
5	0	28.10		10.0	
	1	32.50	4.40		
	2	37.00	4.50		
	3	41.40	4.40		
	4	45.90	4.50	**4.47**	
	5				

Summary	**25.5**	**35**
Flow rate (gpm)	Pressure (psi)	
1.73	4.0	
5.07	12.5	
7.20	23.0	
5.63	15.0	
4.47	10.0	



Permeability Summary

MPV-04-182c

from	to		Step 1	Step 2	Step 3	Step 4	Step 5	Avg K
19.5	24	gauge (psi)	3	6	9	6	3	
		Qavg (igpm)	0.45	1.05	1.3	1	0.4	
		K cm/sec	**2.6E-04**	**3.1E-04**	**2.6E-04**	**2.9E-04**	**2.4E-04**	2.7E-04
22.5	30	gauge (psi)	11	13.5	20	15	11	
		Qavg (igpm)	0.1	0.13	0.15	0.1	0.05	
		K cm/sec	**9.6E-06**	**1.0E-05**	**7.9E-06**	**7.1E-06**	**4.8E-06**	7.9E-06
22.5	32	gauge (psi)	8.5	15	20	15.5	7.5	
		Qavg (igpm)	0.1	0.15	0.15	0.15	0.05	
		K cm/sec	**9.8E-06**	**8.4E-06**	**6.3E-06**	**8.1E-06**	**5.6E-06**	7.6E-06
25.5	35	gauge (psi)	4	12.5	23	15	10	
		Qavg (igpm)	1.73	5.07	7.2	5.63	4.47	
		K cm/sec	**3.6E-04**	**3.4E-04**	**2.6E-04**	**3.1E-04**	**3.7E-04**	3.3E-04
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	#DIV/0!
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	#DIV/0!

Overall **1.5E-04**

Equations:

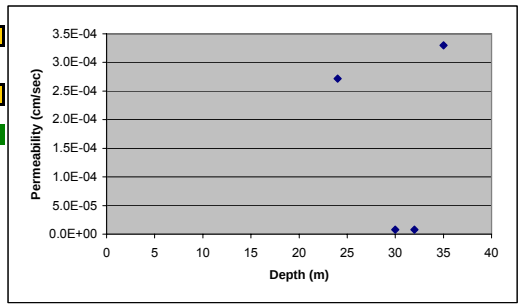
$Hf = 8.65x10^{-15} (Q^2 * Lp/rp^5)$

$H_{nit} = (Dw' + Hg - Hf) + Pg/1.42$

$K = (Q * Ln(R/r_b))/2*\pi*H_{nit}*L)$

assume
- vertical drillhole
- water at ground surface
- height of gauge is at rig flr
- negligible friction losses

Dw	Measured depth of static water (1)	*0*	m
Dp	Measured depth to packer		m
Dt	Depth to midpoint of test		m
Inc	Inclination from horizontal	*90*	m
Dw'	Vertical depth to static water level		°
Dp'	Vertical depth to packer		m
Dt'	Vertical depth to midpoint of test		m
Hg	Gauge height	*0*	m
Lp	Length of discharge pipe		m
rp	Radius of discharge pipe (1" = 0.0127m)		m
R	Radius of influence (10m is standard)	10	m
rb	Drillhole radius (HQ=0.048m, NQ=0.038m)	0.038	m
L	Length of test section		m
Hf		0	m



Reflex Readings

MPV-04-182c

Date	Hole Depth (m)	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Field	Temp ©
26-Mar-04	35	215.9	86.4	165.8	5826	9.3

FIELD GEOLOGICAL LOG

HOLE ID **MPV-04-182c**

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	0.60	Air			JS
0.6	2	ICE			JS
2.00	10.00	Water			JS
10.00	15.00	TILL		two boulders in till, granite and amphibolite	JS
15.00	35.00	Diabase		medium grained, diabase dyke, ophitic texture.	JS

EOH

UCS SAMPLE MASTER LIST				
HOLE #	**BOX #**	**DEPTH**	**ROCK TYPE**	**SAMPLE #**
MPV-04-182C	3	28.03	Ampibolite	04-UCS-182-001

POINT LOAD TEST - INPUT

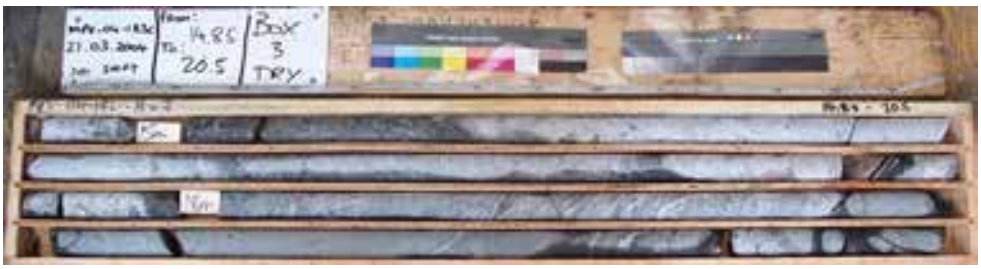
DRILL HOLE ID: #REF!

No. #	Tested by	DATE	HOLE/ FACE ID	DIST. (m)	ROCK TYPE	TEST TYPE	ORINT	DAYS	W (mm)	D (mm)	P (kN)	COMMENT

MPV_04_183C

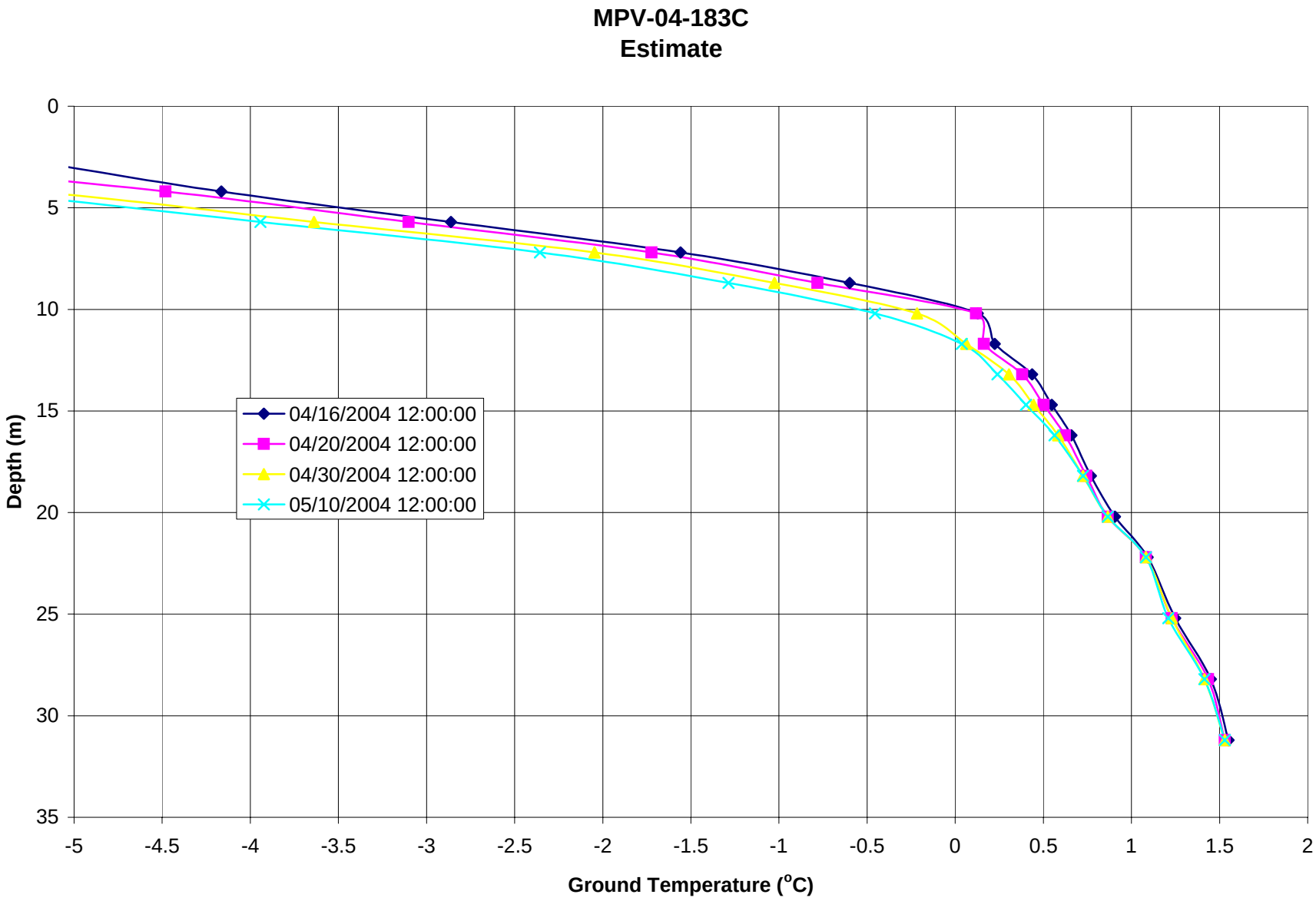

3.5
9.3
Box
TRY.


9.3
14.85
Box
2
TRY.


14.85
20.5
Box
3
TRY.


20.5
26.2
Box
4
TRY.


26.2
31.2
Box
5
TRY.


MPV-04-183C
Estimate
Depth (m)
0
5
10
15
20
25
30
35
-5
-4.5
-4
-3.5
-3
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Ground Temperature (°C)
04/16/2004 12:00:00
04/20/2004 12:00:00
04/30/2004 12:00:00
05/10/2004 12:00:00

Diary

MPV-04-183c

NS 26/03/2004 **Target depth = 31.2m**

Rig floor = 0.0m, depths to top of:
ICE = 0.7m
TILL = 1.2m
Bedrock = 3m

1900	setup water line
	drop tower and setup
1000	casing
1045	replace valve in water line
1115	resume casing
0200	casing set to 3.5m
0200	begin coring
0300	at 9m
0345	change bit
0430	resume drilling
0510	check bit, need to change again?
0520	bit gone change
0555	resume drilling
0615	at 12m

DS 27/03/2004

0840	at 18
0920	at 21
0950	at 24
1050	at 27
1130	at 30
1200	reflex complete
1230	thermistor installed

SRK Consulting
Engineers and Scientists

FIELD DRILL PERFORMANCE LOG

PROJECT	**Gahcho Kue Geotech**
PROJECT NO	**2CD002.11**
NORTHING	7036458.68
EASTING	589769.59
SURFACE ELEVATION	404.8
AZIMUTH	30
DIP	70

HOLE NO:	**MPV-04-183c**
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	2200 26.03.2004
FINISH DATE AND TIME	1230 27.03.2004
HOLE DIAMETER	47.6 (NQ)
DRILLING METHOD	Diamond core

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
NS 1900-0700	J Siddorn	26/03/2004	0630	12	6	12	set-up, hoses, change bit twice	12	6	2.00	12	6	6	2.00
DS 0700-1900	R Bowden	27/03/04		5.5	1.5	19.20	install thermistor, reflex, end hole	7.2	4	1.80	17.5	7.5	10	1.92

OVERALL HOLE DRILL RATE (m/hr)	1.10
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	1.92

GENERAL GEOTECH LOG

DRILLHOLE ID: **MPV-04-183c**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
0.00	0.70	0.70	AIR							
0.70	1.20	0.50	ICE							
1.20	3.00	1.80	TILL							
3.00	6.00	3.00	GR	3.00	100.0	3.00	100.0	3.00	100.0	0.5m core lost to reaming down with HQ bit
6.00	9.00	3.00	GR	3.00	100.0	3.00	100.0	3.00	100.0	
9.00	12.00	3.00	GR	3.00	100.0	3.00	100.0	3.00	100.0	
12.00	15.00	3.00	GR	3.00	100.0	2.83	94.3	2.83	94.3	
15.00	18.00	3.00	GR	3.00	100.0	3.00	100.0	3.00	100.0	
18.00	21.00	3.00	GGRN	3.00	100.0	2.97	99.0	2.97	99.0	Gniessic Granite with biotite seams
21.00	24.00	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
24.00	27.00	3.00	GRN	3.00	100.0	2.46	82.0	2.41	80.3	
27.00	30.00	3.00	GRN	3.00	100.0	3.00	100.0	2.88	96.0	
30.00	31.20	1.20	GRN							

DETAILED GEOTECHNICAL LOG

DRILLHOLE ID: **MPV-04-183c**

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

FROM	TO	ROCK	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of			JOINT CONDITIONS				COMMENT
(m)	(m)	TYPE	STRONG R	WEAK R	% WEAK	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH	Sets	Type	Totals	ANGLE	ROUGH	ALT	FILL	
0.00	0.70	**AIR**																		
0.70	1.20	**ICE**																		
1.20	3.00	**TILL**																		
3.00	6.00	**GR**	R5		0	8	0	6	0	0	0	0	2	J1	3	45	5	0	9	
														J2	3	70	5	0	9	
6.00	9.00	**GR**	R5		0	14	0	9	0	0	0	0	2	J1	4	45	5	0	9	
														J2	5	70	5	0	9	
9.00	12.00	**GR**	R5		0	16	0	8	0	0	0	0	2	J1	6	70	8	0	9	
														J2	2	30	4	0	9	
12.00	15.00	**GR**	R5		0	8	0	4	0		0		3	J1	2	60	7	0	9	
														J2	1	40	7	0	9	
														J3	1	15	1	0	9	
15.00	18.00	**GR**	R5		0	5		1	0		0		1	J1	1	51	4	0	3	J1 as partial carbonate coating
18.00	21.00	**GGRN**	R6		0	9		7	0		0		3	J1	2	55	4	0	3	**GGRN = Gneissic Cranite,** J1 and J2 have partial carbonate coatings; J2 fractures are mostly in biotite seams
														J2	4	45	1	0	3	
														J3	1	20	7	0	3	
21.00	24.00	**GR**	R5		0	9	0	5	0		0		2	J1	3		1	0	3	J1 as angles of 30, 65, 80; J2 has angles of 30 and 62; all joints have carbonate coating
														J2	2		5	0	3	
24.00	27.00	**GR**	R5		0	27	0	13	0		0		3	J1	2	20	6	0	3	J3 has carbonate coating on approx half of joints and roughness of 1 and 4
														J2	1	85	3	0	9	
														J3	10		1	0	9	
27.00	30.00	**GR**	R5		0	11	0	8	0		0		3	J1	1	85	3	0	9	J2 has various angles reflecting foliation variability, and half of joints have carbonate caoting
														J2	5		1	0	3	
														J3	1	40	7	0	3	
30.00	31.20	**GR**	R5		0	4	0	2	0		0		2	J1	1	85	7	0	3	
														J2	1	35	3	0	3	

Photo Record

MPV-04-183c

Date	Shift	Filename	Depth	Description
26.03.04	NS 1900-0700	MPV-04-183C_3.5m_Box1_dry	3.5-9.3m	Box 1 granite
27.03.04	DS 0700-1900	MPV-04-182C_9.3m_Box2_dry	9.3 - 14.85	
27.03.04	DS 0700-1900	MPV-04-182C_14.85m_Box3_dry	14.85 - 20.5	
27.03.04	DS 0700-1900	MPV-04-183C_20.5m_Box4_dry	20.5 - 26.2	
27.03.04	DS 0700-1900	MPV-04-183C_26.2m_Box5_dry	26.2 - 31.2	Box 5, EOH

Core Box Record

MPV-04-183c

Box	From	To	Comments
1	3.50	9.30	
2	9.30	14.85	
3	14.85	20.50	
4	20.50	26.20	
5	26.20	31.20	EOH

Reflex Readings

MPV-04-183c

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Field	Temp ©
27-Mar-04	31.2	10.5	68.3	288.5	6007	13.9

Thermistor Readings

MPV-04-183c

Thermistor String ID **32/16 - 22**

Thermis Node	Reading (kOhms)	Comments
1		all channels active before installation
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		

FIELD GEOLOGICAL LOG

HOLE ID **MPV-04-183c**

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	0.7	Air			JS
0.70	1.20	ICE		Ice	JS
1.20	3.00	Till		Overburden: till	JS
3.00	18.00	Granite		Granite	JS/RB
18.00	21.00	Gneissic Granite		Gneissic granite	RB
21.00	31.20	Granite		flesic granite; occasional biotitic seams, trace pyrite,	RB

UCS SAMPLE LIST				
HOLE #	**BOX #**	**DEPTH**	**ROCK TYPE**	**SAMPLE #**
MPV-04-183C	5	30.47	GRANITE	04-UCS-183-001

POINT LOAD TEST - INPUT

DRILL HOLE ID: MPV-04-183C

No. #	Tested by	DATE	HOLE/ FACE ID	DIST. (m)	ROCK TYPE	TEST TYPE	ORINT	DAYS	W (mm)	D (mm)	P (PSI)	COMMENT	
	BAM	04/08/2004	MPV-04-183C	30.90	META SED	1	RIGHT			47.30	1450.00	FAILED TEST	ON BANDS
	BAM	04/08/2004	MPV-04-183C	30.90	META SED	1	RIGHT			47.30	2450.00	GOOD TEST	P.L. TESTS UNRELIABLE ON METASEDS.-- AXIAL BIAS ON
	BAM	04/08/2004	MPV-04-183C	30.90	META SED	1	RIGHT			47.30	2050.00	POOR TEST	P.L. TESTS UNRELIABLE ON METASEDS.-- AXIAL BIAS ON
	BAM	04/08/2004	MPV-04-183C	30.90	META SED	1	RIGHT			47.30	1950.00	FAILED ON VEIN	P.L. TESTS UNRELIABLE ON METASEDS.-- AXIAL BIAS ON

MPV_04_184C

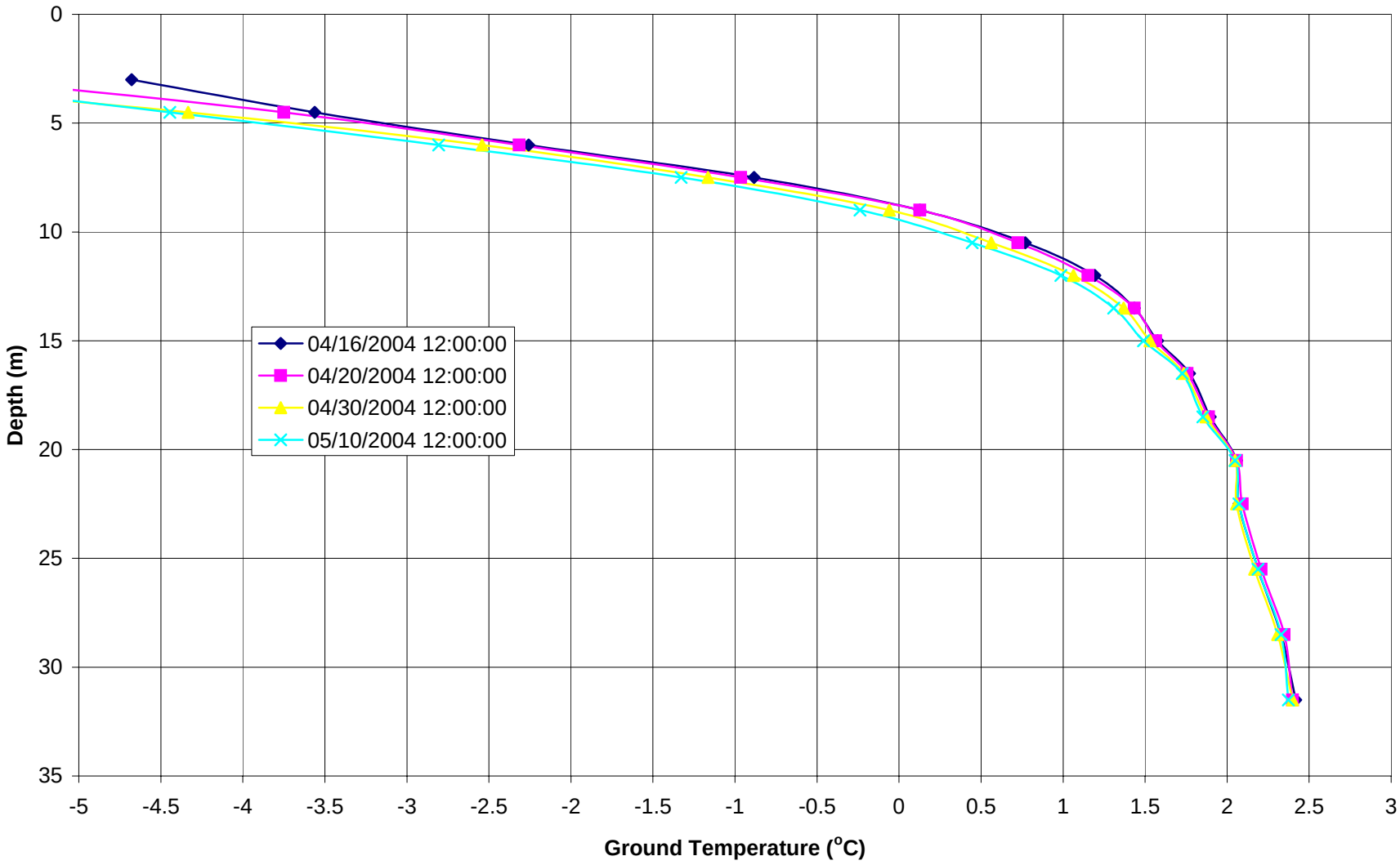

MPV-04-184C
23/03/2004
NIGHTSHIFT
From 2.7m
To 9.0m
Box 1
DRY


MPV-04-184C
23/03/2004
NIGHTSHIFT
From 9.0m
To 14.6m
Box 2
DRY


MPV-04-184C
23/03/2004
NIGHTSHIFT
From 14.6m
To 20.1m
Box 3
DRY


MPV-04-184C
23/03/2004
NIGHTSHIFT
From 20.1m
To 25.5m
Box 4
DRY


MPV-04-184C
23/03/2004
NIGHTSHIFT
From 25.5m
To 31.5m
Box 5&6
DRY EOH


MPV-04-184C
Depth (m)
0
5
10
15
20
25
30
35
-5
-4.5
-4
-3.5
-3
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
3
Ground Temperature (°C)
04/16/2004 12:00:00
04/20/2004 12:00:00
04/30/2004 12:00:00
05/10/2004 12:00:00

Diary

MPV-04-184c

DS 27/03/2004

1700 **Rig floor = 0.0m. Depth to top of …**
Snow = 0.6m
Ground Surface = 1.5m
Bedrock Surface = 2.7m
Casing set at 3.3m

NS 27/03/2004 **Target depth = 31.5m**

1900 at 6m
2000 at 9m
2030 at 12m
2100 at 15m
2130 at 18m
2200 at 21m
2230 at 24m
2300 at 27m
2330 at 30m
0000 at 31.5m EOH
0030 reflex
0100 install thermistor

Checklist - delete before finalizing and printing file

reflex??
protective pipe?

staked?
summary updated?
point load test samples selected?

SRK Consulting
Engineers and Scientists

FIELD DRILL PERFORMANCE LOG

PROJECT	**Gahcho Kue Geotech**
PROJECT NO	**2CD002.11**
NORTHING	7035454
EASTING	591485
SURFACE ELEVATION	405.16
AZIMUTH	30
DIP	70

HOLE NO:	**MPV-04-184c**
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	1700 27.03.04
FINISH DATE AND TIME	0100 28.03.04
HOLE DIAMETER	47.6 (NQ)
DRILLING METHOD	Diamond core

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
DS 0700-1900	R Bowden	27.03.04	1830	2	0	6		6	2	3.00	2	0	2	3.00
NS 1900-0700	J Siddorn	27.03.04	0630	5.5	1	31.50	install thermistor, reflex	25.5	4.5	5.67	7.5	1	6.5	4.85

OVERALL HOLE DRILL RATE (m/hr)	4.20
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	4.85

GENERAL GEOTECH LOG

DRILLHOLE ID: **MPV-04-184c**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
0.00	0.60	0.60	AIR							
0.60	1.80	1.20	ICE							
1.80	2.70	0.90	TILL							
2.70	6.00	3.30	GR	3.30	100.0	3.26	98.8	3.21	97.3	granite
6.00	9.00	3.00	GR	3.00	100.0	3.00	100.0	2.86	95.3	granite
9.00	12.00	3.00	GR	3.00	100.0	3.00	100.0	3.00	100.0	granite
12.00	15.00	3.00	GR	3.00	100.0	3.00	100.0	2.94	98.0	granite
15.00	18.00	3.00	GR	3.00	100.0	3.00	100.0	3.00	100.0	granite
18.00	19.50	1.50	GR	1.50	100.0	1.50	100.0	1.50	100.0	granite
19.50	21.00	1.50	AMPGN	1.50	100.0	1.50	100.0	1.50	100.0	amphibolite gneiss
21.00	24.00	3.00	GR	3.00	100.0	3.00	100.0	3.00	100.0	mixed granite and ampibolite gneiss
24.00	27.00	3.00	AMPGN	3.00	100.0	2.80	93.3	2.60	86.7	amphibolite gneiss
27.00	30.00	3.00	AMPGN	3.00	100.0	2.92	97.3	2.92	97.3	amphibolite gneiss
30.00	31.50	1.50	AMPGN	1.50	100.0	0.75	50.0	0.75	50.0	amphibolite gneiss
EOH		#VALUE!								
		0.00								
		0.00								
		0.00								
		0.00								
		0.00								
		0.00								
		0.00								
		0.00								

DETAILED GEOTECHNICAL LOG

DRILLHOLE ID: **MPV-04-184c**

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

FROM	TO	ROCK	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of			JOINT CONDITIONS				COMMENT
(m)	(m)	TYPE	STRONG R	WEAK R	% WEAK	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH	Sets	Type	Totals	ANGLE	ROUGH	ALT	FILL	
0.0	0.6	AIR																		
0.6	1.8	ICE																		
1.8	2.7	TILL																		
2.7	6.0	GR	R5		0	15	0	9	0	0	0	0	2	J1	6	70	5	0	9	
														J2	3	35	5	0	9	
6.0	9.0	GR	R5		0	9	0	6	0	0	0	0	1	J1	6	65	5	0	9	
9.0	12.0	GR	R5		0	11	0	6	0	0	0	0	1	0	6	65	5	0	9	
12.0	15.0	GR	R5		0	13	0	5	0	0	0	0	1	J1	5	65	5	0	9	
15.0	18.0	GR	R5		0	12	0	6	0	0	0	0	3	J1	3	65	5	0	9	
														J2	1	90	5	0	9	
														J3	2	110	5	0	9	
18.0	19.5	GR	R5		0	4	0	1	0	0	0	0	1	J1	1	65	5	0	9	
19.5	21.0	AMPGN	R4		0	10	0	7	0	0	0	0	3	J1	3	45	5	0	9	
														J2	2	65	5	0	9	
														J3	2	20	5	0	9	
21.0	24.0	GN/GR	R5	R4	40	9	0	5	0	0	0	0	3	J1	1	20	5	0	9	
														J2	3	60	5	0	9	
														J3	1	30	6	0	9	
24.0	27.0	GN	R4		0	17	0	14	0	0	0	0	3	J1	7	65	5	0	9	
														J2	7	35	5	0	9	broken section 25.5-25.8m multiple joints
27.0	30.0	GN	R4		0	14	0	8	0	0	0	0	2	J1	4	20	5	0	9	
														J2	4	40	8	0	9	
30.0	31.5	GN	R4		0	12	0	12	0	0	0	0	2	J1	6	20	5	0	9	
														J2	6	40	5	0	9	EOH. Broken zone 30.7-31.1m

Photo Record

MPV-04-184c

Date	Shift	Filename	Depth	Description
27.03.2004	NS 1900-0700	MPV-04-184C_2.7m_Box1_dry	2.7-9m	
27.03.2004	NS 1900-0700	MPV-04-184C_9m_Box2_dry	9-14.6m	
27.03.2004	NS 1900-0700	MPV-04-184C_14.6m_Box3_dry	14.6-20.1m	
27.03.2004	NS 1900-0700	MPV-04-184C_20.1m_Box4_dry	20.1-25.5m	
27.03.2004	NS 1900-0700	MPV-04-184C_25.5m_Box5_Box6_EOH_dry	25.5-31.5m	

Core Box Record

MPV-04-184c

Box	From	To	Comments
1	2.70	9.00	
2	9.00	14.60	
3	14.60	20.10	
4	20.10	25.50	
5	25.50	30.70	
6	30.70	31.50	EOH

Reflex Readings

MPV-04-184c

Date	Hole Depth	Pull back	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Field	Temp ©
27.03.04	33m	7.5m	9.4	67.9	165.4	6005	10.1

FIELD GEOLOGICAL LOG

HOLE ID **MPV-04-184c**

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	0.60	AIR			
0.6	1.8	ICE			
1.80	2.70	TILL			
2.70	19.50	GRANITE		coarse grained granite, orthoclase feldspar, plagioclase feldspar, quartz, biotite. Minor pegmatite veins	
19.50	21.00	AMPHIBOLITE GNEISS		black ampibolite gneiss with quartz/feldspar bands, strong coarse foliation, in line with core axis	
21.00	24.00	Granite/amphibolite gneiss		mixed layers of granite and amphibolite gneiss (0.5m thick)	
24.00	31.50	AMPHIBOLITE GNEISS		black ampibolite gneiss with quartz/feldspar bands, strong coarse foliation, in line with core axis	

Thermistor Readings

MPV-04-184c

Thermistor String ID **32/16 B**

Thermis Node	Reading (kOhms)	Comments
1	10.80	all thermistors working fine
2	10.80	
3	11.50	
4	11.28	
5	11.36	
6	10.93	
7	11.82	
8	11.45	
9	12.22	
10	11.98	
11	12.30	
12	12.09	
13	12.86	
14	12.19	
15	13.22	
16	12.95	

UCS SAMPLE LIST				
HOLE #	**BOX #**	**DEPTH**	**ROCK TYPE**	**SAMPLE #**
MPV-04-184C	1	6.32	GRANITE	04-UCS-184-001

POINT LOAD TEST - INPUT

DRILL HOLE ID: MPV-04-184C

No. #	Tested by	DATE	HOLE/ FACE ID	DIST. (m)	ROCK TYPE	TEST TYPE	ORINT	DAYS	W (mm)	D (mm)	P (PSI)	COMMENT
	BAM	04/08/2004	MPV-04-184C	16.20	GRANITE	1	LEFT			48.00	1750.00	
	BAM	04/08/2004	MPV-04-184C	16.20	GRANITE	1	LEFT			48.00	1750.00	
	BAM	04/08/2004	MPV-04-184C	16.20	GRANITE	1	LEFT			48.00	1620.00	
	BAM	04/08/2004	MPV-04-184C	16.80	GRANITE	1	RIGHT			48.00	2150.00	
	BAM	04/08/2004	MPV-04-184C	16.80	GRANITE	1	RIGHT			48.00	1980.00	
	BAM	04/08/2004	MPV-04-184C	16.80	GRANITE	1	RIGHT			48.00	2300.00	

GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	*DESCRIPTION*	*Mpa*
R0	EXTREMELY WEAK ROCK	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	VERY WEAK ROCK	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	WEAK ROCK	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	MEDIUM STRONG ROCK	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	STRONG ROCK	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	VERY STRONG ROCK	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	EXTREMELY STRONG ROCK	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY	
CODE	*DESCRIPTION*
0	NONE
1	MINOR
2	MODERATE
3	HEAVY

DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	*CATEGORY*
0	STRONG (NEVER BREAKS)
1	MODERATE (SOMETIMES BREAKS)
3	WEAK (ALWAYS BREAKS)

JOINT CONDITION - SMALL SCALE		
CODE	*CATEGORY*	*SUBCATEGORY*
1	STEPPED	ROUGH
2		SMOOTH
3		SLICKENSIDED
4	UNDULATING	ROUGH
5		SMOOTH
6		SLICKENSIDED
7	PLANAR	ROUGH
8		SMOOTH
9		SLICKENSIDED

JOINT FILLING		
CODE	*CATEGORY*	*SUBCATEGORY*
1	NON	COARSE
2	SOFTENING	MEDIUM
3		FINE
4	SOFT	COARSE
5	SHEARED	MEDIUM
6		FINE
7	GOUGE THIKNESS < IRREGULARITIES	
8	GOUGE THIKNESS > IRREGULARITIES	
9	NO INFILL	

JOINT ALTERATION	
CODE	*DESCRIPTION*
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE

Laubscher	Jr	JRC
1	4	20
2	3	14
3	2	11

STEPPED

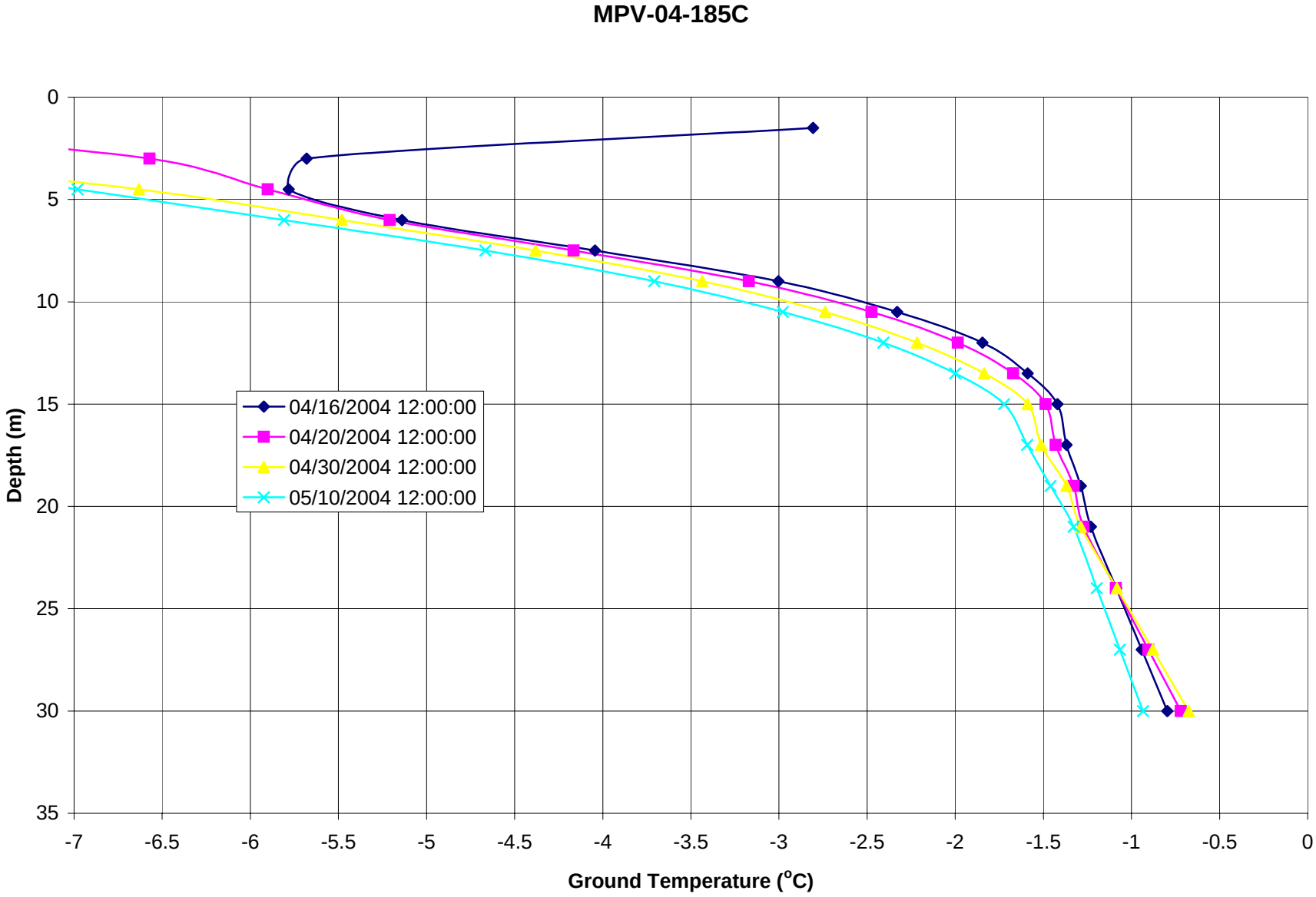
4	3	14
5	2	11
6	1.5	7

UNDULATING

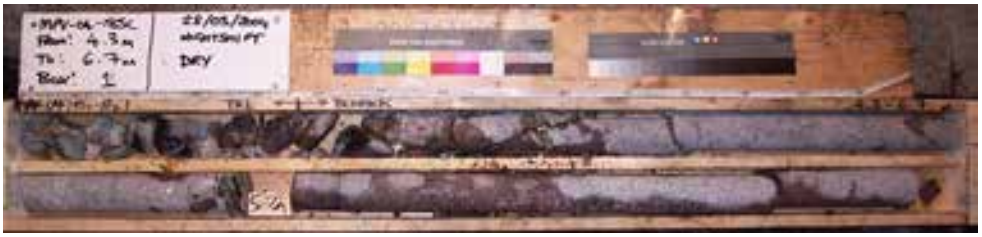
7	1.5	2.5
8	2	1.5
9	0.5	0.5

PLANAR

STEFFEN, ROBERTSON AND KIRSTEN
Consulting Engineers


MPV-04-185C
Depth (m)
0
5
10
15
20
25
30
35
-7
-6.5
-6
-5.5
-5
-4.5
-4
-3.5
-3
-2.5
-2
-1.5
-1
-0.5
0
Ground Temperature (°C)
04/16/2004 12:00:00
04/20/2004 12:00:00
04/30/2004 12:00:00
05/10/2004 12:00:00

MPV_04_185C



MPV_04_185C

Diary MPV-04-185c

DS 28/03/2004	setup drill
NS 28/03/2004	**Target depth 31.2m**
	rig floor = 0.0m Depths to top of ...
	snow = 0.7m
	Till = 1.2m
	bedrock = 4.3m
	drilling HQ; no NQ bits on site
1900	setup water lines (in and return)
2230	begin casing
2330	casing set at 4.5m
0005	at 5.7m
1230	wrong spring and bit (hq-3) need hq
	no locking rings for hq either
0215	resume drilling
0400	at 11.7m
0415	return line (box) problems
0515	resume drilling
0625	at 14.7m
DS 29/03/2004	
0900	at 20.7m
	Hardy sludge pump lame; slow repairs; new pieces; inexperience
1200	drilling again
1300	at 26.7m
1430	at 29.7m
	sludge pump under-sized; unable to keep up with drilling flows; found and installed battery and made connections to bring larger pump online
1530	larger pump online but flows presisting beneath rig
1600	moved sludge line discharge point approx 30m east to try and identify source of, and reduce, flows beneath the drill rig and onto pad 3T; currently no flow through rods or into cuttings box so this cannot be the source
	flows diminished when drilling and circulation stopped
	space between cuttings box and casing stuffed
	stopped drilling and lifted floor boards - no apparent flows beneath rig although flows continuing outside rig
	all hoses checked - no leaks
1700	ice undermined at drill
	hole stopped at 30m
	thermistor installed, no reflex taken

SRK Consulting
Engineers and Scientists

FIELD DRILL PERFORMANCE LOG

PROJECT	**Gahcho Kue Geotech**
PROJECT NO	**2CD002.11**
NORTHING	7034738.82
EASTING	589929.45
SURFACE ELEVATION	407.67
AZIMUTH	310
DIP	70

HOLE NO:	**MPV-04-185c**
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	28.03.04 0100
FINISH DATE AND TIME	29.03.2004 1930
HOLE DIAMETER	63.3 (HQ)
DRILLING METHOD	Diamond core

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
NS 1900-0700	J Siddorn	28.03.04		12	6	14.7	setup drill at site	14.7	6	2.45	12	6	6	2.45
DS 0700-1900	R Bowden	29.03.04		12	6	30.00		15.3	6	2.55	24	12	12	2.50

OVERALL HOLE DRILL RATE (m/hr)	1.25
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	2.50

GENERAL GEOTECH LOG

DRILLHOLE ID: **MPV-04-185c**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
		0.00								
0.00	0.70	0.70	Air							
0.70	1.20	0.50	ICE							
1.20	4.30	3.10	Till							
4.30	5.70	1.40	GR	1.40	100.0	1.40	100.0	1.30	92.9	
5.70	8.70	3.00	GR	3.00	100.0	3.00	100.0	3.00	100.0	
8.70	11.70	3.00	GR	3.00	100.0	3.00	100.0	3.00	100.0	
11.70	14.70	3.00	GR	3.00	100.0	3.00	100.0	3.00	100.0	
14.70	17.70	3.00	GR	3.00	100.0	3.00	100.0	3.00	100.0	
17.70	20.70	3.00	GR	3.00	100.0	3.00	100.0	3.00	100.0	
20.70	23.70	3.00	GR	3.00	100.0	2.74	91.3	2.66	88.7	
23.70	26.70	3.00	GR	3.00	100.0	2.95	98.3	2.80	93.3	
26.70	29.70	3.00	GR	3.00	100.0	3.00	100.0	2.84	94.7	
29.70	30.00	0.30	GR	0.30	100.0	0.30	100.0	0.30	100.0	EOH

DETAILED GEOTECHNICAL LOG

DRILLHOLE ID: **MPV-04-185c**

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

FROM	TO	ROCK	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of			JOINT CONDITIONS				COMMENT
(m)	(m)	TYPE	STRONG R	WEAK R	% WEAK	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH	Sets	Type	Totals	ANGLE	ROUGH	ALT	FILL	
0.0	0.7	Air																		
0.7	1.2	ICE																		
1.2	4.3	Till																		
4.3	5.7	GR	R5		0	6	0	6	0	0	0	0	2	J1	2	20	5	0	9	
														J2	4	55	5	0	9	
5.7	8.7	GR	R5		0	8	0	5	0	0	0	0	2	J1	2	25	5	0	9	
														J2	3	45	5	0	9	
8.7	11.7	GR	R5		0	10	0	5	0	0	0	0	2	J1	3	30	5	0	9	
														J2	2	75	5	0	9	
11.7	14.7	GR	R5		0	10	0	6	0	0	0	0	2	J1	3	30	5	0	9	
														J2	3	70	5	0	9	
14.7	17.7	GR	R5		0	12	0	8	0	0	0	0	3	J1	3	65	1	0	3	Most joints have slight carboate coating and some moderate hematite staining
														J2	2	60	4	0	9	
														J3	1	55	7	0	9	
17.7	20.7	GR	R5		0	14	0	5	0	0	0	0	3	J1	2	20	7	0	9	Partial carbonate coating on some joints
														J2	1	20	1	0	9	
														J3	1	50	7	0	9	
20.7	23.7	GR	R5		0	18	0	12	0	0	0	0	3	J1	1	28	6	0	9	J2 has occasional silt and ematite coatings;
														J2	4	43	4	0	9	
														J3	2	70	4	0	3	
23.7	26.7	GR	R5		0	14	0	12	0	0	0	0	3	J1	4	75	3	0	9	Most joints have moderate carbonate and/or hematite coatings. J3 has angles between 40 and 50. Remaining joints typically stepped or rough
														J2	1	56	2	0	9	
														J3	3		6	0	9	
26.7	29.7	GR	R5		0	13	0	10	0	0	0	0	3	J1	2	45	9	0	9	
														J2	3	25	6	0	9	
														J3	1	65	7	0	6	
29.7	30.0	GR	R5		0	2	0	2	0	0	0	0	2	J1	1	65	5	0	9	
														J2	1	35	5	0	9	
EOH																				

Photo Record

MPV-04-185c

Date	Shift	Filename	Depth	Description
28.03.04	NS 1900-0700	MPV-04-185C_4.3m_Box1_dry	4.3-6.7m	
28.03.04	NS 1900-0700	MPV-04-185C_6.7m_Box2_dry	6.7-9.5m	
28.03.04	NS 1900-0700	MPV-04-185C_returnbox_spill_1		
28.03.04	NS 1900-0700	MPV-04-185C_returnbox_spill_2		
28.03.04	NS 1900-0700	MPV-04-185C_9.5m_Box3_dry	9.5 - 12.0	
28.03.04	NS 1900-0700	MPV-04-185C_12.0m_Box4_dry	12.0 - 14.7	
29.03.04	DS 0700-1900	MPV-04-185C_14.7m_Box5_dry	14.7 - 17.5	
29.03.04	DS 0700-1900	MPV-04-185C_17.5m_Box6_wet	17.5 - 20.1	
29.03.04	DS 0700-1900	MPV-04-185C_20.1m_Box7_wet	20.1 - 22.85	
29.03.04	DS 0700-1900	MPV-04-185C_2.85m_Box8_wet	22.85 - 25.7	
29.03.04	DS 0700-1900	MPV-04-185C_25.7m_Box9_wet	25.7 - 28.7	
29.03.04	DS 0700-1900	MPV-04-185C_28.7m_Box10_dry	28.7-30	

Core Box Record

MPV-04-185c

Box	From	To	Comments
1	4.30	6.70	
2	6.70	9.50	
3	9.50	12.00	
4	12.00	14.70	
5	14.70	17.50	
6	17.50	20.10	
7	20.10	22.85	
8	22.85	25.70	
9	25.70	28.70	
10	28.70	30.00	

Reflex Readings **MPV-04-185c**

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Field	Temp ©
not completed						

Thermistor Readings

MPV-04-185c

Thermistor String ID **32/16-C**

Thermis Node	Reading (kOhms)	Comments
1		all channels active before installation
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		

FIELD GEOLOGICAL LOG

HOLE ID **MPV-04-185c**

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	0.7	Air			
0.70	1.20	ICE			
1.20	4.30	Till			
4.30	30.00	Granite			

UCS SAMPLE LIST				
HOLE #	**BOX #**	**DEPTH**	**ROCK TYPE**	**SAMPLE #**
MPV-04-185C	10	28.99	GRANITE	04-UCS-185-001

POINT LOAD TEST - INPUT

DRILL HOLE ID: MPV-04-185C

No. #	Tested by	DATE	HOLE/ FACE ID	DIST. (m)	ROCK TYPE	TEST TYPE	ORINT	DAYS	W (mm)	D (mm)	P (PSI)	COMMENT
	BAM	04/08/2004	MPV-04-185C	28.90	GRANITE	1	LEFT			63.84	3450.00	GOOD TEST
	BAM	04/08/2004	MPV-04-185C	29.40	GRANITE	1	RIGHT			63.84	2750.00	
	BAM	04/08/2004	MPV-04-185C	29.40	GRANITE	1	RIGHT			63.84	3200.00	
	BAM	04/08/2004	MPV-04-185C	29.90	GRANITE	1	RIGHT			63.84	3070.00	

MPV_04_187C


MAV-04-187C
Box: 1
From: 5.7m
To: 7.5m
DRY


MAV-04-187C
Box: 2
From: 7.5m
To: 10.1m
DRY


MAV-04-187C
Box: 3
From: 10.1m
To: 12.9m
DRY

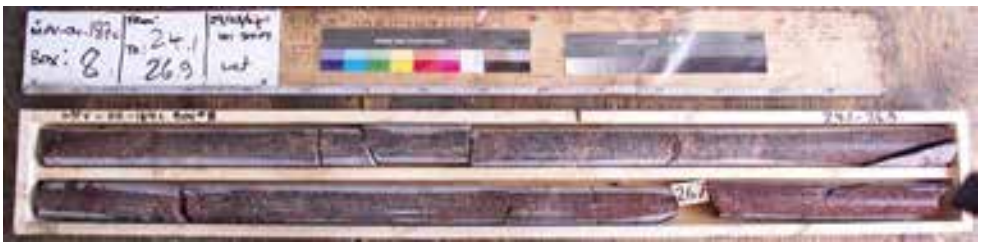

MAV-04-187C
Box: 4
From: 12.9
To: 15.7m
DRY

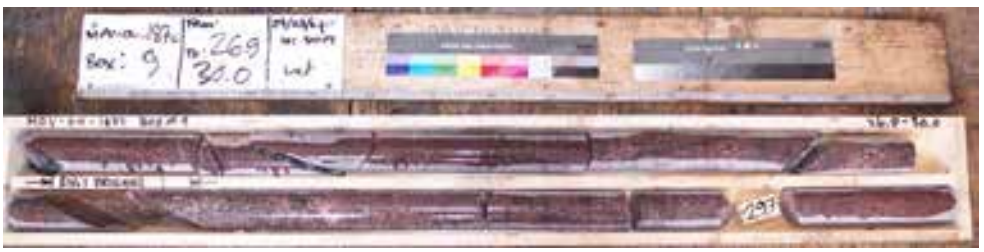

MAV-04-187C
Box: 5
From: 15.7m
To: 18.6m
DRY


MAV-04-187C
Box: 6
From: 18.6
To: 21.4

MPV_04_187C


Box: 7
To: 21.4
24.1
wet


Box: 8
To: 24.1
26.9
wet


Box: 9
To: 26.9
30.0
wet


Box: 10
To: 30.0
32.7
wet


2004 03 30

Diary MPV-04-187c

NS 30/03/2004	**Target depth 32.65m**
	rig floor = 0.0m Depths to top of ...
	snow = 0.65m
	Till = 2.65m
	bedrock = 5.2m
1900	begin move to new ddh
0130	begin casing
0210	casing set to 5.5m
0300	at 5.7m
0345	at 8.7m
0415	at 11.7m
0445	at 14.7m
0530	at 17.7m
0615	at 20.7m
DS 30/03/2004	
0740	at 23.7m
0820	at 26.7m
0930	at 32.7m
1030	reflex
1100	thermistor installed
	staked
	no protective pipe - ground surface 2.7m below snow surface

SRK Consulting
Engineers and Scientists

FIELD DRILL PERFORMANCE LOG

PROJECT	**Gahcho Kue Geotech**
PROJECT NO	**2CD002.11**
NORTHING	7034758.38
EASTING	589925.77
SURFACE ELEVATION	405.2
AZIMUTH	310
DIP	70

HOLE NO:	**MPV-04-187c**
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	1900 29.03.04
FINISH DATE AND TIME	1230 30.03.04
HOLE DIAMETER	63.3 (HQ)
DRILLING METHOD	Diamond core

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
NS 1900-0700	J Siddorn	29.03.04	0630	12	6.5	20.7	move and setup drill at site	20.7	5.5	3.76	12	6.5	5.5	3.76
DS 0700-1900	R Bowden	30.03.04	1830	12	7	32.70	packing and moving	12	5	2.40	24	13.5	10.5	3.11

OVERALL HOLE DRILL RATE (m/hr)	1.36
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	3.11

GENERAL GEOTECH LOG

DRILLHOLE ID: **MPV-04-187c**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
		0.00								
0.00	0.65	0.65	Air							
0.65	2.65	2.00	ICE							
2.65	5.20	2.55	Till							
5.20	5.70	0.50	GR	0.50	100.0	0.50	100.0	0.50	100.0	
5.70	8.70	3.00	GR	3.00	100.0	3.00	100.0	2.93	97.7	
8.70	11.70	3.00	GR	3.00	100.0	3.00	100.0	2.85	95.0	
11.70	14.70	3.00	GR	3.00	100.0	3.00	100.0	3.00	100.0	
14.70	17.70	3.00	GR	3.00	100.0	3.00	100.0	2.91	97.0	
17.70	20.70	3.00	GR	3.00	100.0	2.96	98.7	2.96	98.7	
20.70	23.70	3.00	GR	3.00	100.0	3.00	100.0	2.91	97.0	
23.70	26.70	3.00	GR	3.00	100.0	3.00	100.0	3.00	100.0	
26.70	29.70	3.00	GR	3.00	100.0	3.00	100.0	3.00	100.0	
29.70	32.70	3.00	GR	3.00	100.0	2.92	97.3	2.92	97.3	EOH

DETAILED GEOTECHNICAL LOG

DRILLHOLE ID: **MPV-04-187c**

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

FROM	TO	ROCK	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of			JOINT CONDITIONS				COMMENT
(m)	(m)	TYPE	STRONG R	WEAK R	% WEAK	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH	Sets	Type	Totals	ANGLE	ROUGH	ALT	FILL	
0.0	0.7	Air																		
0.7	2.7	ICE																		
2.7	5.2	Till																		
5.2	5.7	GR	R5		0	2	0	0	0	0	0	0								
5.7	8.7	GR	R5		0	13	0	9	0	0	1	0	3	J1	2	25	4	0	9	
														J2	2	35	5	0	9	
														J3	5	60	6	0	9	
8.7	11.7	GR	R5		0	15	0	13	0	0	0	0	3	J1	7	25	6	0	9	
														J2	3	60	5	0	9	
														J3	3	45	5	0	9	
11.7	14.7	GR	R5		0	10	0	5	1	0	0	0	2	J1	4	60				J2 one is cemented joint, strong slickenslide
														J2	2	20	9	0	9	
14.7	17.7	GR	R5		0	10	0	4	0	0	1	0	2	J1	3	58	5	0	9	
														J2	1	20	5	0	9	
17.7	20.7	GR	R5		0	3	0	2	0	0	0	0	1	J1	2	70	5	0	9	
20.7	23.7	GR	R5		0	8	0	2	0	0	0	0	2	J1	1	74	4	0	9	
														J2	1	90	1	0	9	
23.7	26.7	GR	R5		0	9	0	5	0	0	0	0	3	J1	1	15	7	0	9	J2 has angles of 20, 50, 72 and partial carbonate coating
														J2	3		1	0	9	
														J3	1	60	4	0	9	
26.7	29.7	GR	R5		0	9	0	4	0	0	0	0	2	J1	2	30	1	0	9	Joints have partial carbonate coating
														J2	2	20	4	0	9	
29.7	32.7	GR	R5		0	8	0	5	0	0	0	0	3	J1	3		4	0	9	J1 has angles of 10, 30, 60 and patrial to complete carbonate coating
														J2	1	30	5	0	9	
														J3	1	20	1	0	9	

FIELD GEOLOGICAL LOG

HOLE ID **MPV-04-187c**

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	0.65	Air			JS
0.65	2.65	ICE			JS
2.65	5.20	Till			JS
5.20	32.70	Granite			JS/RB

Photo Record

MPV-04-187c

Date	Shift	Filename	Depth	Description
29/03/04	NS 1900-0700	MPV-04-187C_5.2m_Box1_dry	5.2-7.5m	
29/03/04	NS 1900-0700	MPV-04-187C_7.5m_Box2_dry	7.5-10.1m	
29/03/04	NS 1900-0700	MPV-04-187C_10.1m_Box3_dry	10.1-12.9m	
29/03/04	NS 1900-0700	MPV-04-187C_12.9m_Box4_dry	12.9-15.7m	
29/03/04	NS 1900-0700	MPV-04-187C_15.7m_Box5_dry	15.7-18.6m	
30/03/04	DS 0700-1900	MPV-04-187C_18.6m_Box5_wet	18.8-21.4m	
30/03/04	DS 0700-1900	MPV-04-187C_21.4m_Box7_wet	21.4-24.1m	
30/03/04	DS 0700-1900	MPV-04-187C_24.1m_Box8_wet	24.1 - 26.9m	
30/03/04	DS 0700-1900	MPV-04-187C_26.9m_Box9_wet	2.69-30.0m	
30/03/04	DS 0700-1900	MPV-04-187C_30.0m_Box10_wet	30.0 - 32.7m	

Core Box Record

MPV-04-187c

Box	From	To	Comments
1	5.20	7.50	
2	7.50	10.10	
3	10.10	12.90	
4	12.90	15.70	
5	15.70	18.60	
6	18.60	21.40	
7	21.40	24.10	
8	24.10	26.90	
9	26.90	30.00	
10	30.00	32.70	EOH

Reflex Readings **MPV-04-187c**

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Field	Temp ©
30/03/03	32.7	340.1	70.6	41.7	6048	11

Thermistor Readings

MPV-04-187c

Thermistor String ID **32/16 - A**

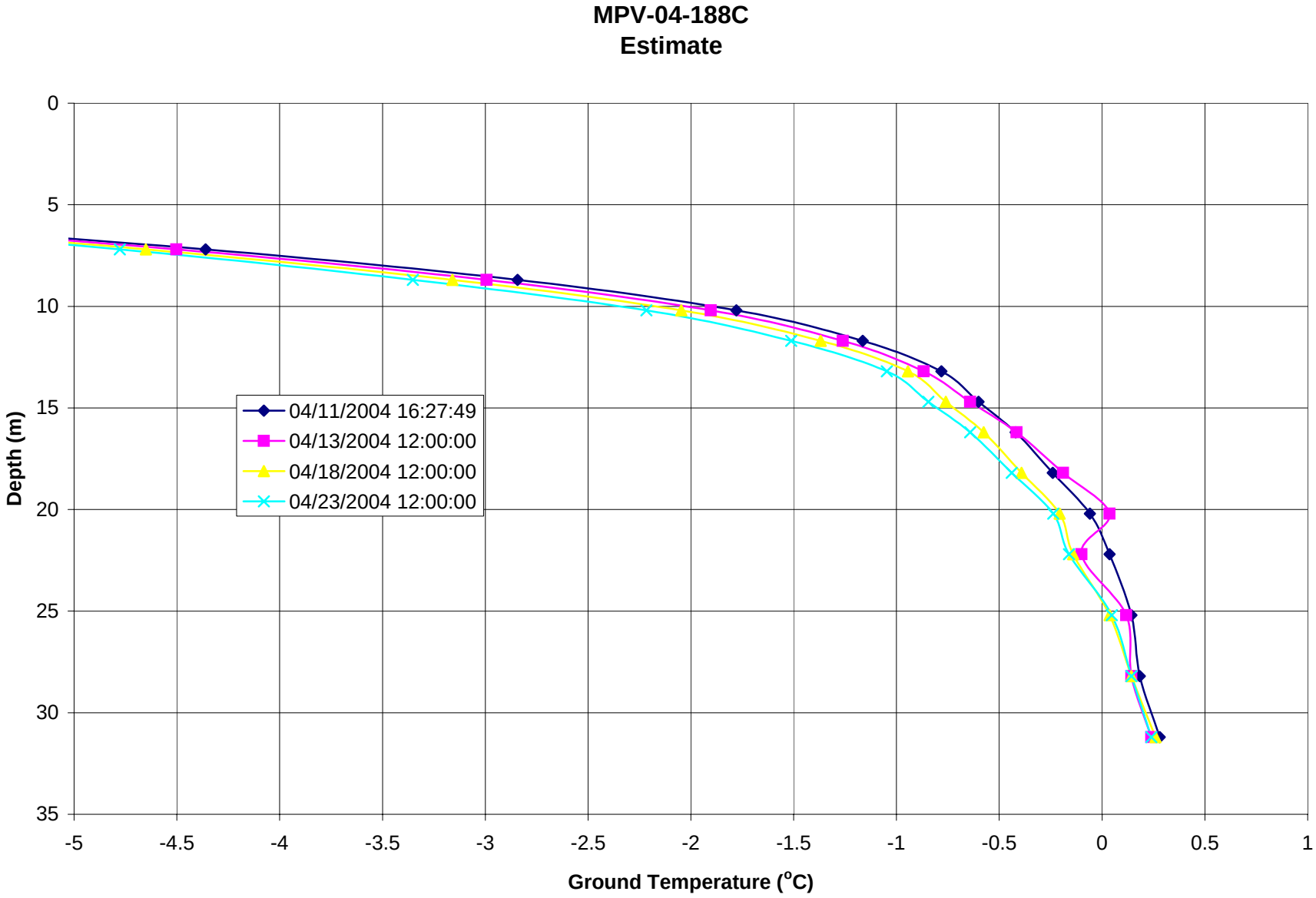
Thermis Node	Reading (kOhms)	Comments
1		all channels active before installation
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		

UCS SAMPLE LIST				
HOLE #	**BOX #**	**DEPTH**	**ROCK TYPE**	**SAMPLE #**
MPV-04-187C	5	17.19	GRANITE	04-UCS-187-001

POINT LOAD TEST - INPUT

DRILL HOLE ID: MPV-04-187C

No. #	Tested by	DATE	HOLE/ FACE ID	DIST. (m)	ROCK TYPE	TEST TYPE	ORINT	DAYS	W (mm)	D (mm)	P (PSI)	COMMENT
	BAM	04/08/2004	MPV-04-187C	17.00	GRANITE	1	LEFT			63.50	2400.00	GOOD TEST
	BAM	04/08/2004	MPV-04-187C	17.00	GRANITE	1	LEFT			63.50	2600.00	GOOD TEST
	BAM	04/08/2004	MPV-04-187C	17.00	GRANITE	1	LEFT			63.50	2850.00	GOOD TEST
	BAM	04/08/2004	MPV-04-187C	17.80	GRANITE	1	RIGHT			63.50	2800.00	GOOD TEST
	BAM	04/08/2004	MPV-04-187C	17.80	GRANITE	1	RIGHT			63.50	2950.00	GOOD TEST
	BAM	04/08/2004	MPV-04-187C	17.80	GRANITE	1	RIGHT			63.50		FAILED TEST


MPV-04-188C
Estimate
Depth (m)
0
5
10
15
20
25
30
35
-5
-4.5
-4
-3.5
-3
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
Ground Temperature (°C)
04/11/2004 16:27:49
04/13/2004 12:00:00
04/18/2004 12:00:00
04/23/2004 12:00:00

MPV_04_188C


MPV-04-188C
Box: 1
From: 2.6 m
To: 4.95 m
DRY


MPV-04-188C
Box: 2
From: 4.95 m
To: 8.1 m
DRY


MPV-04-188C
Box: 3
From: 8.1 m
To: 10.55 m
DRY


MPV-04-188C
Box: 4
From: 10.55 m
To: 13.55 m
DRY


MPV-04-188C
Box: 5
From: 13.55 m
To: 16.20 m
DRY

MPV_04_188C


MPV-04-188C
Box: 6
16.20
18.95
DRY


MPV-04-188C
Box: 7
18.95
21.95
DRY
wet


MPV-04-188C
Box: 8
21.95
24.70
DRY
wet


MPV-04-188C
Box: 9
24.30
27.6
DRY
wet


MPV-04-188C
10+11
27.6
30.8
DRY
wet

Diary

MPV-04-188c

NS 30/03/2004 **Target depth 30.8m**
rig floor = 0.0m Depths to top of ...
snow = 0.7m
Till = 0.8m
bedrock = 2.6m (= 1.8m till thickness)

1900 setup pump shack, water line, rod sloop, shacks
1040 begin casing
1110 casing set to 2.9m
1230 at 5.3m
1245 fixing pump
0115 resume drilling
0145 at 8.4m
0145 core stuck in bit/barrel
need to pull rods to clear bit
0215 resume drilling
0300 at 11.5m
0400 at 14.5m
core keeps being lost from lifter, checked bit wrong, HQ3 need
0415 to pull rods to change to HQ
0450 resume drilling
0530 at 17.55m
0615 at 20.6m
0615 driller now caught back up to 3m runs

DS 31/03/2004
0730 at 23.6m
0820 at 26.6m
0900 at 29.6m
0940 at 30.8 EOH
1010 reflex
1030 white out called
1230 white out cancelled
1300 reflex
thermistor installed
protective pipe installed
staked
UCS samples dropped off at core shack
Rig 2 summary updated

SRK Consulting
Engineers and Scientists

FIELD DRILL PERFORMANCE LOG

PROJECT	**Gahcho Kue Geotech**
PROJECT NO	**2CD002.11**
NORTHING	7034995.21
EASTING	589883.15
SURFACE ELEVATION	405.65
AZIMUTH	171
DIP	70

HOLE NO:	**MPV-04-188c**
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	1900 30 Mar20 04
FINISH DATE AND TIME	1100 31 Mar 2004
HOLE DIAMETER	63.5 (HQ)
DRILLING METHOD	Diamond core

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
NS 1900-0700	J Siddorn	30.03.04	0630	12	4.5	20.6	setup water line, pumps, sloop, shacks, f	20.6	7.5	2.75	12	4.5	7.5	2.75
DS 0700-1900	R Bowden			4	3	30.80		10.2	1	10.20	16	7.5	8.5	3.62

OVERALL HOLE DRILL RATE (m/hr)	1.93
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	3.62

GENERAL GEOTECH LOG

DRILLHOLE ID: **MPV-04-188c**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
0.00	0.70	0.70	Air							
0.70	0.80	0.10	ICE							
0.80	2.60	1.80	Till							
2.60	5.30	2.70	GR	2.70	100.0	2.50	92.6	2.40	88.9	
5.30	8.40	3.10	GR	3.10	100.0	2.95	95.2	2.95	95.2	Driller is overdrilling to make up run
8.40	11.50	3.10	GR	3.10	100.0	3.10	100.0	3.10	100.0	Driller is overdrilling to make up run
11.50	14.50	3.00	GR	3.00	100.0	3.00	100.0	3.00	100.0	
14.50	17.55	3.05	GR	3.05	100.0	3.05	100.0	3.05	100.0	Driller is overdrilling to make up run
17.55	20.60	3.05	GR	3.05	100.0	3.05	100.0	3.05	100.0	Driller is now caught up 3m runs from now on
20.60	23.60	3.00	GR	3.00	100.0	2.97	99.0	2.97	99.0	
23.60	26.60	3.00	GR	3.00	100.0	2.96	98.7	2.96	98.7	
26.60	29.60	3.00	GR	3.00	100.0	2.92	97.3	2.92	97.3	

DETAILED GEOTECHNICAL LOG

DRILLHOLE ID: **MPV-04-188c**

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

FROM	TO	ROCK	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of			JOINT CONDITIONS				COMMENT
(m)	(m)	TYPE	STRONG R	WEAK R	% WEAK	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH	Sets	Type	Totals	ANGLE	ROUGH	ALT	FILL	
0.00	0.70	Air																		
0.70	0.80	Ice																		
0.80	2.60	Till																		
2.60	5.30	GR	R5		0	18	0	15	0	0	0	0	3	J1	3	35	7	0	9	
														J2	6	70	7	0	9	
														J3	6	45	5	0	9	
5.30	8.40	GR	R5		0	15	0	7	0	0	0	0	2	J1	3	45	5	0	9	
														J2	4	60	7	0	9	
8.40	11.50	GR	R5		0	9	0	4	0	0	0	0	2	J1	3	65	7	0	9	
														J2	1	15	5	0	9	
11.50	14.50	GR	R5		0	15	0	5	0	0	0	0	1	J1	5	70	5	0	9	Fe staining in J1
14.50	17.55	GR	R5		0	10	0	1	1	0	0	0	2	J1	1	20	5	0	9	J1 is cemented joint
														J2	1	60	5	0	9	
17.55	20.60	GR	R5		0	11	0	5	0	0	0	0	1	J1	5	60	5	0	9	
20.60	23.60	GR	R5		0	7	0	2	0	0	0	0	1	J1	2	35	5	0	9	
23.60	26.60	GR	R5		0	10	0	2	0	0	0	0	2	J1	1	80	1	0	9	
														J2	1	65	4	0	9	
26.60	29.60	GR	R5		0	8	0	4	0	0	0	0	3	J1	1	65	7	0	9	
														J2	1	75	4	0	9	
														J3	2	20	4	0	9	
29.60	30.80	GR	R5		0	3	0	0	0	0	0	0								no natural fractures

FIELD GEOLOGICAL LOG

MPV-04-188c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	0.70	Air			JS
0.7	0.8	Snow			JS
0.80	2.60	Till			JS
2.60	30.80	Granite			JS/RB

Photo Record

MPV-04-188c

Date	Shift	Filename	Depth	Description
30.03.04	NS 1900-0700	MPV-04-188C_2.6m_Box1_dry	2.6-4.95m	
30.03.04	NS 1900-0700	MPV-04-188C_4.95m_Box2_dry	4.95-8.1m	
30.03.04	NS 1900-0700	MPV-04-188C_8.1m_Box3_dry	8.1-10.55m	
30.03.04	NS 1900-0700	MPV-04-188C_10.55m_Box4_dry	10.55-13.55m	
30.03.04	NS 1900-0700	MPV-04-188C_13.55m_Box5_dry	13.55-16.2m	
30.03.04	NS 1900-0700	MPV-04-188C_16.2m_Box6_dry	16.2-18.95m	
31.03.04	DS 0700-1900	MPV-04-188C_Box7_18.95m_wet	18.95-21.95m	
31.03.04	DS 0700-1900	MPV-04-188C_Box8_21.95m_wet	21.95-24.70m	
31.03.04	DS 0700-1900	MPV-04-188C_Box9_24.7m_wet	24.7 - 27.6m	
31.03.04	DS 0700-1900	MPV-04-188C_Box10and11_27.6m_wet	27.6 - 30.8	EOH

Core Box Record

MPV-04-188c

Box	From	To	Comments
1	2.60	4.95	
2	4.95	8.10	
3	8.10	10.55	
4	10.55	13.55	
5	13.55	16.20	
6	16.20	18.95	
7	18.95	21.95	
8	21.95	24.70	
9	24.70	27.60	
10	27.60	30.25	
11	30.25	30.80	**EOH**

Reflex Readings **MPV-04-188c**

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Field	Temp ©
Mar 31 2004	30.8	161.4	30.8	260.8	5951	10.4

Thermistor Readings

MPV-04-188c

Thermistor String ID: **32/16 - 21**

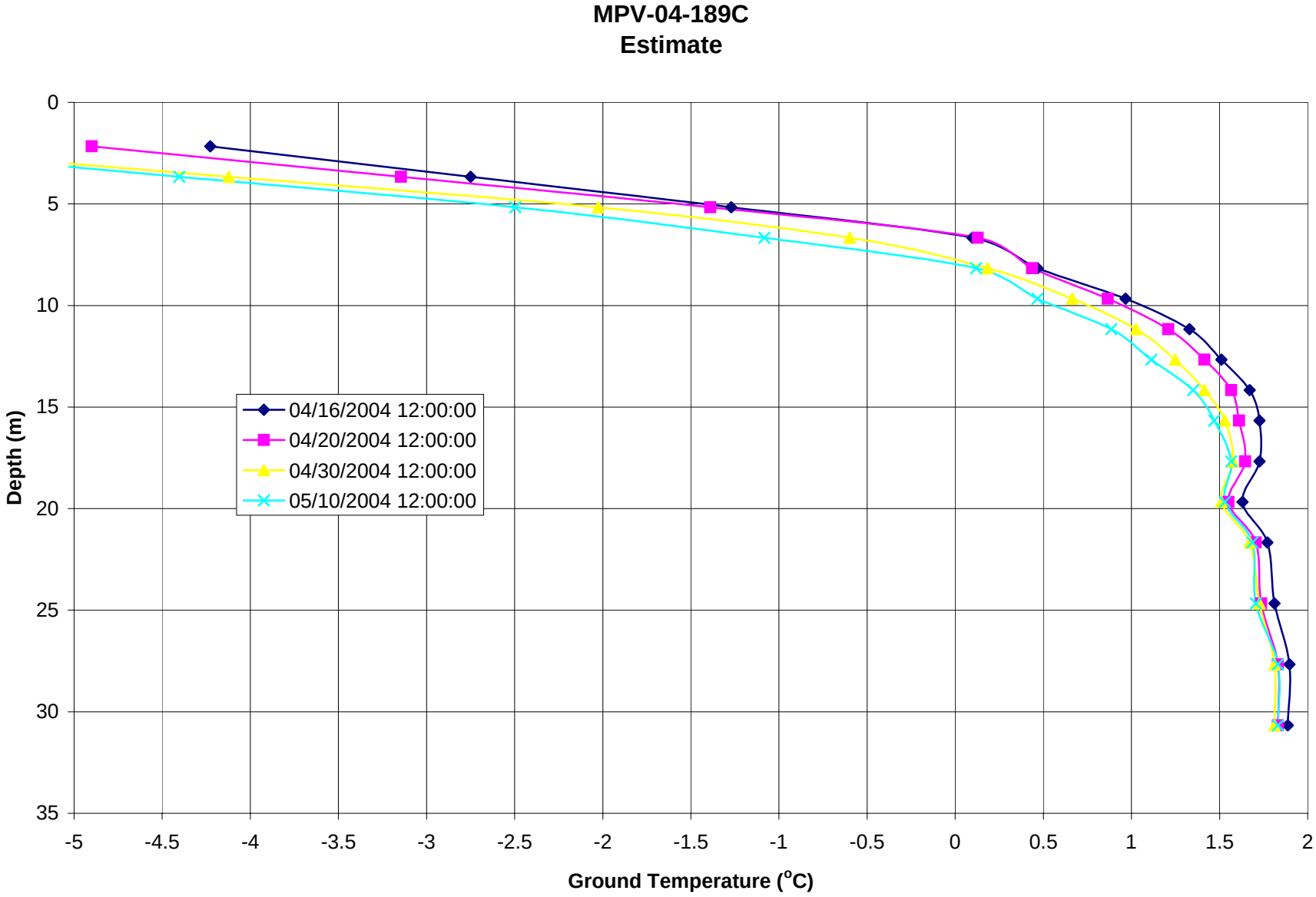
Thermis Node	Reading (kOhms)	Comments
1		all channels active before installation
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		

UCS SAMPLE LIST				
HOLE #	**BOX #**	**DEPTH**	**ROCK TYPE**	**SAMPLE #**
MPV-04-188C	11	30.26	GRANITE	04-UCS-188-001

POINT LOAD TEST - INPUT

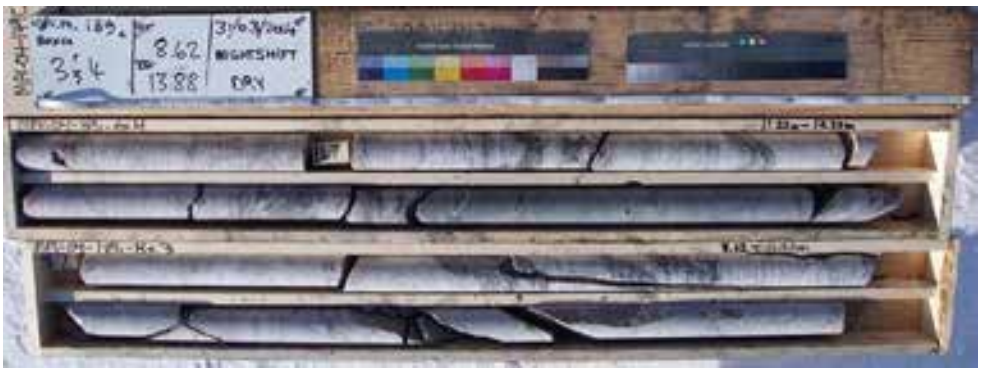
DRILL HOLE ID: MPV-04-188C

No. #	Tested by	DATE	HOLE/ FACE ID	DIST. (m)	ROCK TYPE	TEST TYPE	ORINT	DAYS	W (mm)	D (mm)	P (PSI)	COMMENT
	BAM	04/08/2004	MPV-04-188C	30.60	GRANITE	1	RIGHT			63.50	2950.00	GOOD TEST
	BAM	04/08/2004	MPV-04-188C	30.60	GRANITE	1	RIGHT			63.50	2300.00	GOOD TEST
	BAM	04/08/2004	MPV-04-188C	30.60	GRANITE	1	RIGHT			63.50	2050.00	GOOD TEST
	BAM	04/08/2004	MPV-04-188C	30.60	GRANITE	1	RIGHT			63.50	2550.00	GOOD TEST


MPV-04-189C
Estimate
Depth (m)
0
5
10
15
20
25
30
35
-5
-4.5
-4
-3.5
-3
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Ground Temperature (°C)
04/16/2004 12:00:00
04/20/2004 12:00:00
04/30/2004 12:00:00
05/10/2004 12:00:00

MPV_04_189C


1,2
2.70
8.62
NIGHTSHIFT
DRY


3,4
8.62
13.88
NIGHTSHIFT
DRY


5,6,7
13.88
22.35
NIGHTSHIFT
DRY


8,9,10
22.35
30.67
NIGHTSHIFT
DRY

Diary

MPV-04-189c

	target depth is 30.0m below ground surface
DS 31/03/2004	
1830	casing at 0.6m - not set
	Rig Floor = 0.0m Depths to top of …
	snow = 0.7m
	ground surface = 0.73m
	bedrock = 2.7m
NS 31/03/2004	
20:30	casing set to 3.0m
21:15	at 5.7m
22:00	at 8.7m
23:00	at 14.7m
23:45	changing bit
0:15	at 17.7m
0:45	at 20.7m
1:45	at 23.7m
2:20	at 26.7m
3:15	EOH @ 30.67
4:15	reflex
5:00	thermistor installed
	protective pipe installed
	staked
	point load samples dropped off at core shack
	Rig 2 summary for Todd updated

SRK Consulting
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FIELD DRILL PERFORMANCE LOG

PROJECT	**Gahcho Kue Geotech**
PROJECT NO	**2CD002.11**
NORTHING	7034975.54
EASTING	589886.7
SURFACE ELEVATION	404.28
AZIMUTH	171
DIP	70

HOLE NO:	**MPV-04-189c**
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	1900 March 31, 2004
FINISH DATE AND TIME	0500 April 1, 2994
HOLE DIAMETER	47.6 (NQ)
DRILLING METHOD	Diamond core

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
NS 1900-0700	P Mikes	03/31/2004		12	0.3	30.7	changed bits	30.7	11.7	2.62	12	0.3	11.7	2.62

OVERALL HOLE DRILL RATE (m/hr) 2.56

OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr) 2.62

GENERAL GEOTECH LOG

DRILLHOLE ID: **MPV-04-189c**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
0.00	0.70	0.70	Air							
0.70	0.73	0.03	Snow							
0.73	2.70	1.97	Overburden							
2.70	5.70	3.00	GR	3.00	100.0	3.00	100.0	3.00	100.0	
5.70	8.70	3.00	GR	2.92	97.3	2.92	97.3	2.92	97.3	
8.70	11.70	3.00	GR	3.00	100.0	3.00	100.0	3.00	100.0	
11.70	14.70	3.00	GR	2.97	99.0	2.97	99.0	2.97	99.0	
14.70	17.70	3.00	GR	3.04	101.3	3.04	101.3	3.04	101.3	
17.70	20.70	3.00	GR	2.98	99.3	2.98	99.3	2.98	99.3	
20.70	23.70	3.00	GR	3.03	101.0	3.03	101.0	3.03	101.0	
23.70	26.70	3.00	GR	3.00	100.0	3.00	100.0	3.00	100.0	
25.70	29.70	4.00	GR	2.90	72.5	2.90	72.5	2.90	72.5	
29.70	30.67	0.97	GR	0.97	100.0	0.97	100.0	0.97	100.0	

DETAILED GEOTECHNICAL LOG

DRILLHOLE ID: **MPV-04-189c**

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

FROM	TO	ROCK	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of			JOINT CONDITIONS				COMMENT
(m)	(m)	TYPE	STRONG R	WEAK R	% WEAK	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH	Sets	Type	Totals	ANGLE	ROUGH	ALT	FILL	
0.00	0.70	**Air**																		
0.70	0.73	**Snow**																		
0.73	2.70	**OVB**																		
2.70	5.70	**GR**	R5		0	21		5	0	0	0	0	2	J1	3	25	5	0	3	
														J2	2	60	5	0	9	
5.70	8.70	**GR**	R5		0	11		3	1	2	0	0	3	J1	1	22	1	0	9	
														J2	1	35	5	0	3	
														J3	1	50	4	0	3	
8.70	11.70	**GR**	R5		0	12		5	2	1	0	0	3	J1	2	10	4	0	9	
														J2	2	30	5	0	3	
														J3	1	33	6	0	9	
11.7	14.7	**GR**	R5		0	11		3	0	0	1	0	3	J1	2	27	2	0	9	
														J2	1	64	4	0	3	
14.7	17.7	**GR**	R5		0	8		2	0	0	1	0	2	J1	1	52	5	0	3	
														J2	1	57	4	0	3	
17.7	20.7	**GR**	R5		0	12		7	1	0	0	0	3	J1	1	41	4	0	3	
														J2	2	33	3	0	3	
														J3	2	50	5	0	3	
20.7	23.7	**GR**	R5		0	8		2	1	0	1	0	2	J1	1	10	4	0	9	
														J2	1	20	4	0	3	
23.7	26.7	**GR**	R5		0	13		2	1	1	1	0	2	J1	1	25	5	0	3	
														J2	1	20	4	0	9	
26.7	29.7	**GR**	R5		0	17		5	1	1	0	0	2	J1	4	30	5	0	3	
														J2	1	40	5	0	9	
29.7	30.7	**GR**	R5		0	6		2	0	0	1	1	2	J1	1	20	5	0	3	
														J2	1	35	5	0	9	

Photo Record

MPV-04-189c

Date	Shift	Filename	Depth	Description
1.04.04	DS	MPV-04-189C_Box1to2_2.7m_dry	2.7 - 8.62	
1.04.04	DS	MPV-04-189C_Box3to4_8.62m_dry	8.62 - 13.88	
1.04.04	DS	MPV-04-189C_Box5to7_13.88m_dry	13.88 - 22.35	
1.04.04	DS	MPV-04-189C_Box8to10_22.35m_dry	22.35 - 30.67	

Core Box Record

MPV-04-189c

Box	From	To	Comments
1	2.70	5.70	
2	5.70	8.62	
3	8.62	11.22	
4	11.22	13.88	
5	13.88	16.80	
6	16.80	19.75	
7	19.75	22.35	
8	22.35	25.05	
9	25.05	27.83	
10	27.83	30.67	EOH

Reflex Readings

MPV-04-189c

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolfa	Magnetic F	Temp ©
April 1st, 2004	30.7	154.6	68.6		5881	12.1

(no adjustment)

Thermistor Readings

MPV-04-189c

Thermistor String ID **32/16 - 24**

Thermis Node	Reading (kOhms)	Comments
1		all channels active before installation
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		

FIELD GEOLOGICAL LOG

HOLE ID **MPV-04-189c**

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	0.70	Air			P Mikes
0.7	0.73	Snow			P Mikes
0.73	2.70	Overburden			P Mikes
2.70	30.67	Granite			P Mikes

UCS SAMPLE LIST				
HOLE #	**BOX #**	**DEPTH**	**ROCK TYPE**	**SAMPLE #**
MPV-04-189C	10	28.67	GRANITE	04-UCS-189-001

POINT LOAD TEST - INPUT

DRILL HOLE ID: MPV-04-189C

No. #	Tested by	DATE	HOLE/ FACE ID	DIST. (m)	ROCK TYPE	TEST TYPE	ORINT	DAYS	W (mm)	D (mm)	P (PSI)	COMMENT	
	BAM	04/08/2004	MPV-04-189C	28.50	GRANITE	1	LEFT			63.50	3550.00	FAIR TEST	ANGLED BREAK
	BAM	04/08/2004	MPV-04-189C	28.50	GRANITE	1	LEFT			63.50	2300.00	FAIR TEST	
	BAM	04/08/2004	MPV-04-189C	28.50	GRANITE	1	LEFT			63.50	3100.00	GOOD TEST	
	BAM	04/08/2004	MPV-04-189C	29.80	GRANITE	1	RIGHT			63.50	2600.00	GOOD TEST	
	BAM	04/08/2004	MPV-04-189C	29.80	GRANITE	1	RIGHT			63.50	2650.00	GOOD TEST	
	BAM	04/08/2004	MPV-04-189C	29.80	GRANITE	1	RIGHT			63.50	1850.00	FAIR TEST	ANGLED BREAK

Diary **MPV-04-131c**

NS 09/02/2004	
1900hrs	setting up on hole
0000hrs	white out declared and drilling shut-down
DS 10/02/2004	
0900hrs	white out ended
	cold again; continued setting up
1700hrs	started installing casing
1830hrs	casing set to 4.7m
NS 10/02/2004	
1900hrs	water tank spill
2030hrs	setup return funnel to catch return
2100hrs	drilling
0700hrs	end of shift at m
DS 11/02/2004	
0700hrs	changed altenator
0900hrs	at 23.35m
0930hrs	at 23.55m
1030hrs	at 26.55m
1150hrs	at 29.55m
1330hrs	at31.00m
1450hrs	thermistor installed
	excessive PVC stick-up; thermistor cable partially severed while trying to cut PVC longitudinally
	5 of 16 thermistors active
1600hrs	began packing up to move

SRK Consulting
Engineers and Scientists

FIELD DRILL PERFORMANCE LOG

PROJECT:	**Gahcho Kue Geotech**
PROJECT NO:	**2CD002.11**
NORTHING:	7035 332.6
EASTING:	588 804.9
SURFACE ELEVATION:	405.15
AZIMUTH:	24
DIP:	70

HOLE NO:	**MPV-04-131c**
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	1700hrs 10/2/2004
DATE AND TIME FINISHED:	1200hrs 11/2/2004
HOLE DIAMETER:	63.5 (HQ)
DRILLING METHOD:	Diamond core

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
DS 0700-1900	R Bowden	10/02/2004	1830	12	10.5	4	restart after white-out, pump issues, set ca	4	1.5	2.67	12	10.5	1.5	2.67
NS 1900-0700	J Siddorn	10/02/2004	0630	12	2	21.00	setup return funnel, water tank spill	17	10	1.70	24	12.5	11.5	1.83
DS 0700-1900	R Bowden	11/02/2004		12	6	31.00	replaced altenator (1/2hr), installed thermis	10	6	1.67	36	18.5	17.5	1.77

OVERALL HOLE DRILL RATE (m/hr)	0.86
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	1.77

GEOTECH LOGGING 1 - INPUT (GENERAL GEOTECH LOG)

DRILLHOLE ID: **MPV-04-131c**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
0.00	1.00	1.00	ICE							ICE
1.00	4.60	3.60	OB							Water
4.60	5.70	1.10	GR	1.10	100.0	1.05	95.5	0.81	73.6	Granite Bedrock
5.70	8.70	3.00	GR	3.00	100.0	3.00	100.0	2.86	95.3	Granite
8.70	9.02	0.32	GR	0.32	100.0	0.28	87.5	0.20	62.5	
9.02	11.70	2.68	AMP	2.68	100.0	2.28	85.1	2.28	85.1	Amphibolite
11.70	14.55	2.85	GR/AMP	2.85	100.0	2.58	90.5	2.58	90.5	Mixed amphibolite and granite
14.55	16.05	1.50	GR/AMP	1.50	100.0	1.25	83.3	1.25	83.3	Mixed amphibolite and granite
16.05	17.55	1.50	GR/AMP	1.50	100.0	1.45	96.7	1.37	91.3	Mixed amphibolite and granite
17.55	20.55	3.00	GR/AMP	3.00	100.0	3.00	100.0	2.88	96.0	Mixed amphibolite and granite
20.55	22.35	1.80	GR/AMP	1.80	100.0	1.75	97.2	1.20	66.7	Mixed amphibolite and granite
22.35	23.55	1.20	GR/AMP	1.20	100.0	1.15	95.8	1.15	95.8	Mixed amphibolite and granite
23.55	26.55	3.00	GR/AMP	3.00	100.0	2.92	97.3	2.72	90.7	Mixed amphibolite and granite
26.55	29.55	3.00	GR/AMP	3.00	100.0	2.94	98.0	2.82	94.0	Mixed amphibolite and granite
29.55	31.00	1.45	GR/AMP	1.45	100.0	1.40	96.6	1.20	82.8	END OF HOLE
		0.00								
		0.00								
		0.00								
		0.00								
		0.00								
		0.00								
		0.00								
		0.00								
		0.00								

GEOTECHNICAL LOGGING 2 - INPUT (DETAILED LOG)

DRILLHOLE ID: **MPV-04-131c**

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

FROM	TO	ROCK	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of			JOINT CONDITIONS				COMMENT
(m)	(m)	TYPE	% STRONG	% WEAK	OVERALL	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH	Sets	Type	Totals	ANGLE	ROUGH	ALT	FILL	
4.60	5.70	GR	100	0	100	7	0	0	0	0	1	0								
			R5		R5															
5.70	8.70	GR	100	0	100	14	0	5	0	0	1	0	2	J1	3	45	5	0	9	
			R5		R5									J2	2	60	4	0	9	
8.70	9.02	GR	100	0	100	2	0	2	0	0	0	0	2	J1	1	45	1	0	9	
			R5		R5									J2	1	60	5	0	6	minor chlorite? Clay mineral infi
9.02	11.70	AMP	100	0	100	22	0	11	0	0	0	0	2	J1	4	20	4	0	3	
			R5		R5									J2	7	70	6	0	6	Amphibolite, J1 calcit
11.70	14.55	GR/AMP	100	0	100	18	0	11	0	0	1	0	3	J1	8	40	4	0	3	
			R5		R5									J2	2	24	5	0	9	
														J3	1	0	4	0	9	J1 hematite+calcite
14.55	16.05	GR/AMP	100	0	100	14	0	6	0	0	1	0	3	J1	2	20	4	0	9	
			R5		R5									J2	2	45	4	0	9	
														J3	2	40	5	0	6	
16.05	17.55	GR/AMP	100	0	100	12	0	7	0	0	1	0	2	J1	2	10	4	0	9	
			R5		R5									J2	3	45	5	0	9	
17.55	20.55	GR/AMP	100	0	100	18	0	13	0	0	1	0	3	J1	3	10	4	0	9	
			R5		R5									J2	1	30	6	0	6	
														J3	9	70	2	0	5	
20.55	22.35	GR/AMP	100	0	100	12	0	8	0	0	1	0	3+1	J1	4	50	5	0	9	
			R5		R5									J2	2	80	2	0	9	
														J3	1	33	5	0	3	all joints are in amphibolite, calcite coating on J
22.35	23.55	GR/AMP	100	0	100	5	0	4	0	0	0	0	1+1	J1	1	50	7	0	9	
			R5		R5									J2	3		1	0	9	
23.35	26.55	GR/AMP	100	0	100	18	0	8	0	0	0	0	3+1	J1	4	80	5	0	3	
			R5		R5									J2	1	13	5	0	3	
														J3	1	70	3	0	9	half of J1 have calcite coating; many additional fractures neglected
26.55	29.55	GR/AMP	100	0	100	18	0	4	0	0	0	0	3+1	J1	1	78	5	0	9	
			R5		R5									J2	1	50	5	0	9	
														J3	1	60	1	0	9	J1 and J2 have calcite coating; +1 has joint condition "1"
29.55	31.00	GR/AMP	100	0	100	10	0	1	0	0	0	0	1	J1	1	70	4	0	9	
			R5		R5															END OF HOLE
					100															
					100															

SRK Photo Log Sheet

Drillhole ID: **MPV-04-131c**

Shift	Camera Photo Number	Filename	Depth	Description
NS 1900-0700	716	MPV-04-131c_4.6m_Box1_DRY	4.6 - 6.65	Granite Box 1
NS 1900-0700	717	MPV-04-131c_6.65m_Box2_DRY	6.5 - 9.54	Granite Box 2
NS 1900-0700	718	MPV-04-131c_9.54m_Box3_DRY	9.54 - 12.2	Amphibolite Box 3
NS 1900-0700	719	MPV-04-131c_12.20m_Box4_DRY	12.2 - 14..95	Gran/Amph Box 4
NS 1900-0700	720	MPV-04-131c_14.95m_Box5_DRY	14.95 - 17.35	Gran/Amph Box 5
NS 1900-0700	721	MPV-04-131c_17.35m_Box6_DRY	17.35 - 19.90	Gran/Amph Box 6
DS 0700-1900	722	MPV-04-131c_19.90m_Box7_DRY	19.90 - 22.35	Gran/Amph Box 7
DS 0700-1900		MPV-04-131c_22.35m_Box8_DRY	22.35 - 25.05	Gran/Amph Box 8
DS 0700-1900		MPV-04-131c_25.05m_Box9_DRY	25.05 - 27.70	Box 9
DS 0700-1900		MPV-04-131c_27.70m_Box10_DRY	27.7 - 30.50	Box 10
DS 0700-1900		MPV-04-131c_30.50m_Box11_DRY	30.50 - 31.00	Box 11 - END OF HOLE

Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-131c	1	4.60	6.65
MPV-04-131c	2	6.65	9.54
MPV-04-131c	3	9.54	12.20
MPV-04-131c	4	12.20	14.95
MPV-04-131c	5	14.95	17.35
MPV-04-131c	6	17.35	19.90
MPV-04-131c	7	19.90	22.35
MPV-04-131c	8	22.35	25.05
MPV-04-131c	9	25.05	27.70
MPV-04-131c	10	27.70	30.50
MPV-04-131c	11	30.50	31.00
MPV-04-131c	12	31.00	**End of Hole**
	13		
	14		
	15		
	16		
	17		
	18		
	19		
	20		
	21		
	22		
	23		
	24		
	25		
	26		
	27		
	28		
	29		
	30		

POINT LOAD TEST - INPUT

DRILL HOLE ID: MPV-03-131C

No. #	TESTED BY	DATE	HOLE/ FACE ID	DIST. (m)	ROCK TYPE	TEST TYPE	ORINT	DAYS	W (mm)	D (mm)	P (kN)	COMMENT
1	John Delgaty	##########	MPV-04-131C	20.60	Grn/Dio	1				63.50	27.04	Grey, fine grained granite diorite - hard with a good break
2	John Delgaty	##########	MPV-04-131C	20.76	Grn/Dio	1				63.50	23.46	Grey, fine grained granite diorite - hard and split parallel
3	John Delgaty	##########	MPV-04-131C	21.05	Grn/Dio	1				63.50	31.54	Grey, fine grained granite diorite - hard and chipped
1	John Delgaty	##########	MPV-04-131C	to	Grn/Dio	1				63.50	30.39	Grey, fine grained granite diorite - hard and split oblique
2	John Delgaty	##########	MPV-04-131C		Grn/Dio	1				63.50	23.48	Grey, fine grained granite diorite - hard and chipped
3	John Delgaty	##########	MPV-04-131C	21.71	Grn/Dio	1				63.50	29.33	Grey, fine grained granite diorite - hard and chipped

UCS SAMPLES

HOLE ID: MPV-04-131C

HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-131C	7	20.76	Amphibole	04-UCS-131-001

FIELD GEOLOGICAL LOG

HOLE ID MPV-04-131c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	4.60	Ice/water	n/a	1m ice, to 4.6m water	RB/JS
4.60	9.02	Granite	n/a	Granite	RB/JS
9.02	11.70	Amphibolite	n/a	Amphibolite	RB/JS
9.00	31.00	Granite and Amphibolite	n/a	Granite and Amphibolite	RB/JS
EOH					

Reflex Readings **MPV-04-131C**

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N	Magnetic Fielc	Temp ©
Feb 11 2004	31	10.5	69.3	63.2	5880	13.9

Borehole ID	**MPV-04-131c**
Thermistor String ID	**16/32 - 1**

Ice Bath Readings

Thermistor	Reading (kOhms)	Comments
1	16.25	
2	16.22	
3	16.25	
4	16.23	
5	16.27	
6	16.24	
7	16.25	
8	16.26	
9	16.28	still changing long after others had stabilized
10	16.21	
11	16.27	
12	16.19	
13	16.25	
14	16.18	
15	16.15	
16	16.16	
		Cable partially severed at about 0.3m from 16pin connector; 5 channels active

GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH

	CATEGORY	DESCRIPTION	Mpa
R0	EXTREMELY WEAK ROCK	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	VERY WEAK ROCK	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	WEAK ROCK	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	MEDIUM STRONG ROCK	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	STRONG ROCK	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	VERY STRONG ROCK	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	EXTREMELY STRONG ROCK	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY

CODE	DESCRIPTION
0	NONE
1	MINOR
2	MODERATE
3	HEAVY

DROP TEST - CEMENTED JOINTS/DEFECTS

CODE	CATEGORY
0	STRONG (NEVER BREAKS)
1	MODERATE (SOMETIMES BREAKS)
3	WEAK (ALWAYS BREAKS)

JOINT CONDITION - SMALL SCALE

CODE	CATEGORY	SUBCATEGORY
1	STEPPED	ROUGH
2		SMOOTH
3		SLICKENSIDED
4	UNDULATING	ROUGH
5		SMOOTH
6		SLICKENSIDED
7	PLANAR	ROUGH
8		SMOOTH
9		SLICKENSIDED

JOINT FILLING

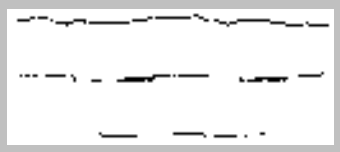
CODE	CATEGORY	SUBCATEGORY
1	NON	COARSE
2	SOFTENING	MEDIUM
3		FINE
4	SOFT	COARSE
5	SHEARED	MEDIUM
6		FINE
7	GOUGE THIKNESS < IRREGULARITIES	
8	GOUGE THIKNESS > IRREGULARITIES	
9	NO INFILL	

JOINT ALTERATION

CODE	DESCRIPTION
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

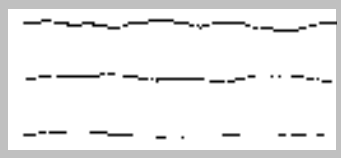
JOINT CONDITIONS - SMALL SCALE

	Laubscher	Jr	JRC
ROUGH	1	4	20
SMOOTH	2	3	14
SLICKEN-SIDED	3	2	11



STEPPED

ROUGH	4	3	14
SMOOTH	5	2	11
SLICKEN-SIDED	6	1.5	7



UNDULATING

ROUGH	7	1.5	2.5
SMOOTH	8	2	1.5
SLICKEN-SIDED	9	0.5	0.5

PLANAR

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Consulting Engineers

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FIELD DRILL PERFORMANCE LOG

PROJECT:	Gahcho Kue Geotech
PROJECT NO:	VM00351.H7

HOLE NO:	**MPV-04-192**
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	04/03/2004 15:30
DATE AND TIME FINISHED:	04/07/2004 1:30
HOLE DIAMETER (mm):	148.0 / 96.1 (SQ / HQ)
CORE DIAMETER (mm):	101.6 / 63.5 (SQ / HQ)

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
DS 0700-1900	K Barnes	04/03/2004	19:00	12	8.5	3.15	Set up at MPV-04-192	3.15	3.5	0.90	12	8.5	3.5	0.90
NS 1900-0700	K Barnes	04/04/2004	07:00	11	4.5	15.00	casing froze in	11.85	6.5	1.82	23	13	10.0	1.50
DS 0700-1900	K Barnes	04/04/2004	19:00	12	12	15.00	White Out	0	0.0	0.00	35	25	10.0	1.50
NS 1900-0700	K Barnes	04/05/2004	07:00	12	12	15.00	White Out	0	0.0	0.00	47	37	10.0	1.50
DS 0700-1900	K Barnes	04/05/2004	19:00	12	10	15.00	White Out / dropped bit down hole	0	2.0	0.00	59	47	12.0	1.25
NS 1900-0700	K Barnes	04/06/2004	07:00	12	10	18.00	Replace bit / Rig stalling due to ice in line	3	2.0	1.50	71	57	14.0	1.29
DS 0700-1900	K Barnes	04/06/2004	19:00	12	12	18.00	Rods frozen in ground	0	0.0	0.00	83	69	14.0	1.29
NS 1900-0700	S Fortin	04/07/2004	07:00	12	10.5	20.20	Rods frozen in ground / install thermistor	2.2	1.5	1.47	95	79.5	15.5	1.30

OVERALL HOLE DRILL RATE (m/hr)	0.21
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	1.30

GENERAL GEOTECHNICAL LOG

DRILLHOLE ID: **MPV-04-192**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	IRS STRONG R	IRS WEAK R	IRS % WEAK	COMMENT
0.00	0.50	0.50	Air										Air
0.50	1.65	1.15	OB	1.00	87.0								
1.65	3.15	1.50	OB	1.50	100.0								
3.15	4.65	1.50	OB	0.80	53.3								
4.65	6.00	1.35	OB	0.40	29.6								
6.00	6.50	0.50	OB	0.40	80.0								
6.50	7.00	0.50	OB	0.50	100.0								
7.00	9.46	2.46	Gneiss	2.46	100.0	1.19	48.4	1.04	42.3	R5	R4	10	
9.46	12.00	2.54	Gneiss	2.53	99.6	2.49	98.0	2.11	83.1	R5	R4	0	
12.00	15.00	3.00	Gneiss	3.00	100.0	2.75	91.7	2.75	91.7	R5	R4	0	
15.00	18.00	3.00	Gneiss	3.00	100.0	2.50	83.3	2.27	75.7	R5	R4	0	
18.00	20.20	2.20	Gneiss	2.20	100.0	1.46	66.4	1.11	50.5	R5	R4	5	Thermistor installed on Completion
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AMEC Photo Log Sheet

Drillhole ID: **MPV-04-192**

Shift	Camera Photo Number	Filename	Depth	Description
DS 0700-1900	MPV_04_192c_00.50_Box1_dry	MPV_04_192c_00.50_Box1_dry	0.50 - 1.65	
DS 0700-1900	MPV_04_192c_01.65_Box2_dry	MPV_04_192c_01.65_Box2_dry	1.65 - 3.15	
DS 0700-1900	MPV_04_192c_03.15_Box3_dry	MPV_04_192c_03.15_Box3_dry	3.15 - 4.65	
DS 0700-1900	MPV_04_192c_04.65_Box4_dry	NA	NA	Poor recover once geobore was open - no Photo
DS 0700-1900	MPV_04_192c_06.00_Box5_dry	MPV_04_192c_06.00_Box5_dry	6.00 - 7.30	Overlap due to casing installation
NS 1900-0700	MPV_04_192c_07.00_Box6_dry	MPV_04_192c_07.00_Box6_dry	7.00 - 9.46	
NS 1900-0700	MPV_04_192c_09.46_Box7_dry	MPV_04_192c_09.46_Box7_dry	9.46 - 12.00	
NS 1900-0700	MPV_04_192c_12.00_Box8_dry	MPV_04_192c_12.00_Box8_dry	12.00 - 15.00	
NS 1900-0700	MPV_04_192c_15.00_Box9_dry	MPV_04_192c_15.00_Box9_dry	15.00 - 18.00	
NS 1900-0700	MPV_04_192c_18.00_Box10_dry	MPV_04_192c_18.00_Box10_dry	18.00 - 20.20	

Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-192	1	0.50	1.65
MPV-04-192	2	1.65	3.15
MPV-04-192	3	3.15	4.65
MPV-04-192	4	4.65	6.00
MPV-04-192	5	6.00	7.30
MPV-04-192	6	7.00	9.46
MPV-04-192	7	9.46	12.00
MPV-04-192	8	12.00	15.00
MPV-04-192	9	15.00	18.00
MPV-04-192	10	18.00	20.20
	11	20.20	
	12		
	13		
	14		
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	16		
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	30		

GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	*DESCRIPTION*	*Mpa*
R0	**EXTREMELY WEAK ROCK**	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	**VERY WEAK ROCK**	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	**WEAK ROCK**	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	**MEDIUM STRONG ROCK**	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	**STRONG ROCK**	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	**VERY STRONG ROCK**	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	**EXTREMELY STRONG ROCK**	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY	
CODE	*DESCRIPTION*
0	NONE
1	MINOR
2	MODERATE
3	HEAVY

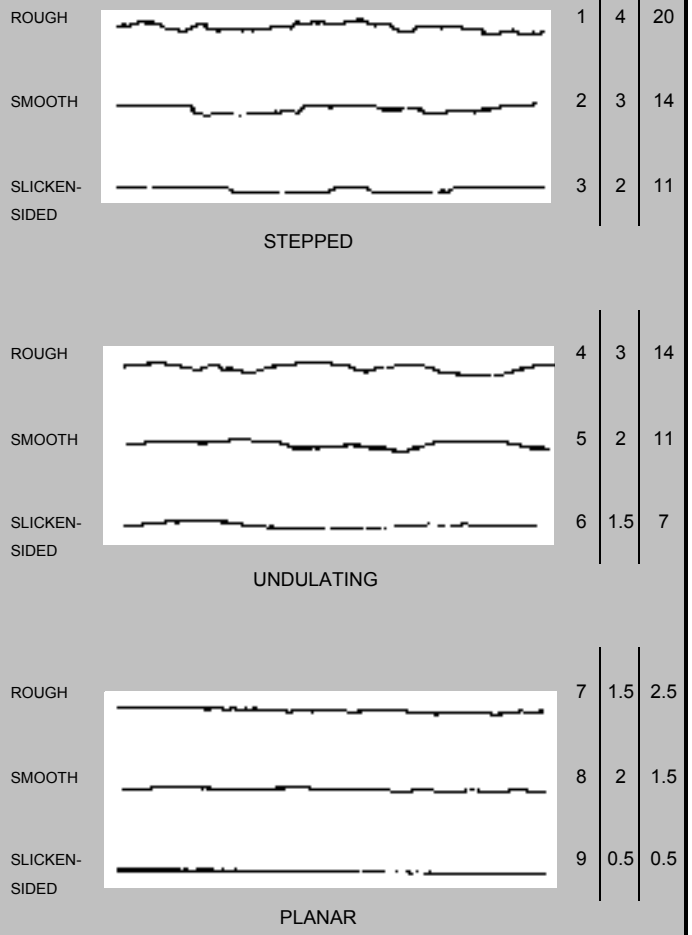
DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	*CATEGORY*
0	STRONG (NEVER BREAKS)
1	MODERATE (SOMETIMES BREAKS)
3	WEAK (ALWAYS BREAKS)

JOINT CONDITION - SMALL SCALE		
CODE	*CATEGORY*	*SUBCATEGORY*
1	STEPPED	ROUGH
2		SMOOTH
3		SLICKENSIDED
4	UNDULATING	ROUGH
5		SMOOTH
6		SLICKENSIDED
7	PLANAR	ROUGH
8		SMOOTH
9		SLICKENSIDED

JOINT FILLING		
CODE	*CATEGORY*	*SUBCATEGORY*
1	NON	COARSE
2	SOFTENING	MEDIUM
3		FINE
4	SOFT	COARSE
5	SHEARED	MEDIUM
6		FINE
7	GOUGE THIKNESS < IRREGULARITIES	
8	GOUGE THIKNESS > IRREGULARITIES	
9	NO INFILL	

JOINT ALTERATION	
CODE	*DESCRIPTION*
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE



	Laubscher	Jr	JRC
ROUGH	1	4	20
SMOOTH	2	3	14
SLICKEN-SIDED	3	2	11
ROUGH	4	3	14
SMOOTH	5	2	11
SLICKEN-SIDED	6	1.5	7
ROUGH	7	1.5	2.5
SMOOTH	8	2	1.5
SLICKEN-SIDED	9	0.5	0.5

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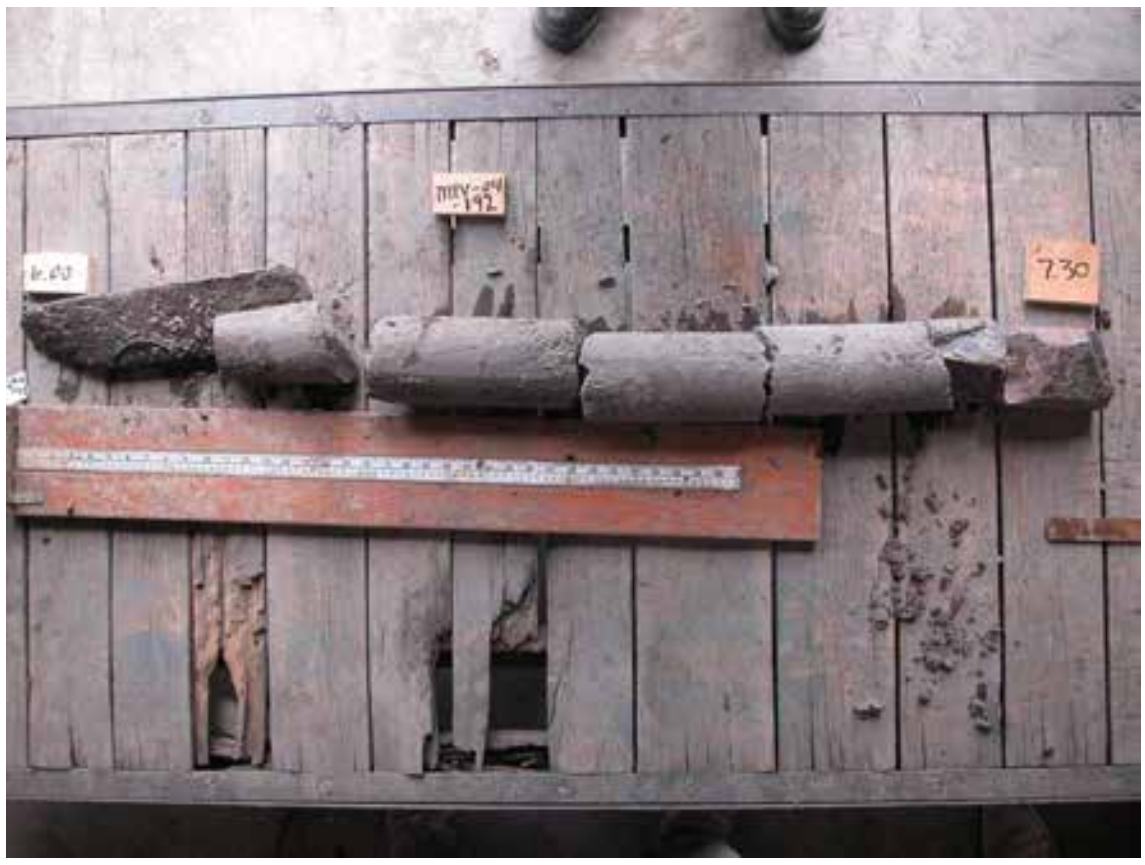
Consulting Engineers

MPV_04_192C

MPV_04_192C



MPV_04_192C

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FIELD DRILL PERFORMANCE LOG

PROJECT:	Gahcho Kue Geotech
PROJECT NO:	VM00351.H7

HOLE NO:	**MPV-04-194**
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	04/07/2004 19:00
DATE AND TIME FINISHED:	04/08/2004 19:00
HOLE DIAMETER (mm):	148.0 / 75.8 (SQ / NQ)
CORE DIAMETER (mm):	101.6 / 47.6 (SQ / NQ)

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
DS 0700-1900	K Barnes	04/07/2004	19:00	12	12	0	Set up at MPV-04-194							
NS 1900-0700	S Fortin	04/08/2004	07:00	12	8.5	2.80	Oil leak, pump down, valve on pump	2.8	3.5	0.80	12	8.5	3.5	0.80
DS 0700-1900	K Barnes	04/08/2004	19:00	12	7	20.50	change bit / demob from MPV-04-194	17.7	5	3.54	24	15.5	8.5	2.41

OVERALL HOLE DRILL RATE (m/hr)	0.57
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	2.41

GENERAL GEOTECHNICAL LOG

DRILLHOLE ID: **MPV-04-194**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	IRS STRONG R	IRS WEAK R	IRS % WEAK	COMMENT
0.00	0.75	0.75	Air										Air
0.75	1.50	0.75	OB										
1.50	2.45	0.95	OB										
2.45	2.80	0.35	OB										
2.80	5.70	2.90	Gneiss	2.90	100.0	2.89	99.7	2.75	94.8	R05	R04	0	
5.70	8.70	3.00	Gneiss	2.90	96.7	2.89	96.3	2.82	94.0	R05	R04	0	
8.70	11.70	3.00	Gneiss	3.00	100.0	2.97	99.0	2.90	96.7	R05	R04	0	
11.70	14.70	3.00	Gneiss	2.96	98.7	2.33	77.7	2.06	68.7	R05	R04	0	
14.70	17.70	3.00	Gneiss	2.97	99.0	2.78	92.7	2.72	90.7	R05	R04	0	
17.70	20.50	2.80	Gneiss	2.80	100.0	2.41	86.1	2.28	81.4	R05	R04	0	Thermistor installed on completion
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AMEC Photo Log Sheet

Drillhole ID: **MPV-04-194**

Shift	Camera Photo Number	Filename	Depth	Description
DS 0700-1900	DSCN2637	MPV-04-194C_00.75_Dry_1	0.75 - 1.70	
DS 0700-1900	DSCN2638	MPV-04-194C_01.70_Dry_2	1.70 - 2.80	
DS 0700-1900	DSCN1726	MPV-04-194C_02.80_Dry_3	2.80 - 6.92	
DS 0700-1900	DSCN1727	MPV-04-194C_06.92_Dry_4	6.92 - 11.17	
DS 0700-1900	DSCN1728	MPV-04-194C_11.17_Dry_5	11.17 - 15.42	
DS 0700-1900	DSCN1729	MPV-04-194C_15.42_Dry_6	15.42 - 18.77	
DS 0700-1900	DSCN1730	MPV-04-194C_18.77_Dry_7	18.77 - 20.50	

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-194	1	0.75	1.70
MPV-04-194	2	1.70	2.80
MPV-04-194	3	2.80	6.92
MPV-04-194	4	6.92	11.17
MPV-04-194	5	11.17	15.42
MPV-04-194	6	15.42	18.77
MPV-04-194	7	18.77	20.50
	8	20.50	
	9		
	10		
	11		
	12		
	13		
	14		
	15		
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GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	*DESCRIPTION*	*Mpa*
R0	**EXTREMELY WEAK ROCK**	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	**VERY WEAK ROCK**	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	**WEAK ROCK**	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	**MEDIUM STRONG ROCK**	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	**STRONG ROCK**	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	**VERY STRONG ROCK**	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	**EXTREMELY STRONG ROCK**	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY	
CODE	*DESCRIPTION*
0	NONE
1	MINOR
2	MODERATE
3	HEAVY

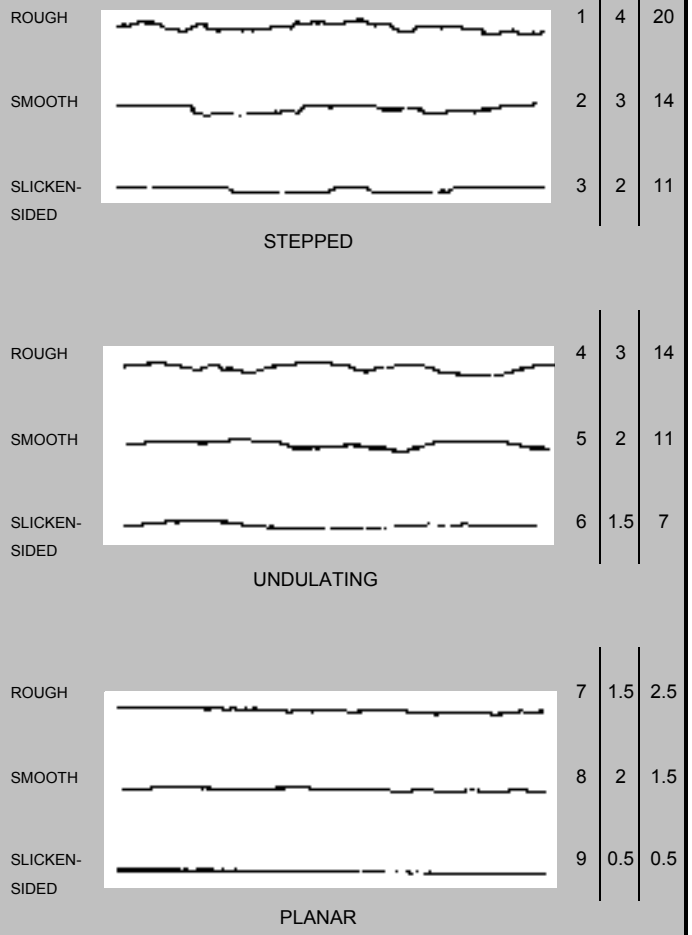
DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	*CATEGORY*
0	STRONG (NEVER BREAKS)
1	MODERATE (SOMETIMES BREAKS)
3	WEAK (ALWAYS BREAKS)

JOINT CONDITION - SMALL SCALE		
CODE	*CATEGORY*	*SUBCATEGORY*
1	STEPPED	ROUGH
2		SMOOTH
3		SLICKENSIDED
4	UNDULATING	ROUGH
5		SMOOTH
6		SLICKENSIDED
7	PLANAR	ROUGH
8		SMOOTH
9		SLICKENSIDED

JOINT FILLING		
CODE	*CATEGORY*	*SUBCATEGORY*
1	NON	COARSE
2	SOFTENING	MEDIUM
3		FINE
4	SOFT	COARSE
5	SHEARED	MEDIUM
6		FINE
7	GOUGE THIKNESS < IRREGULARITIES	
8	GOUGE THIKNESS > IRREGULARITIES	
9	NO INFILL	

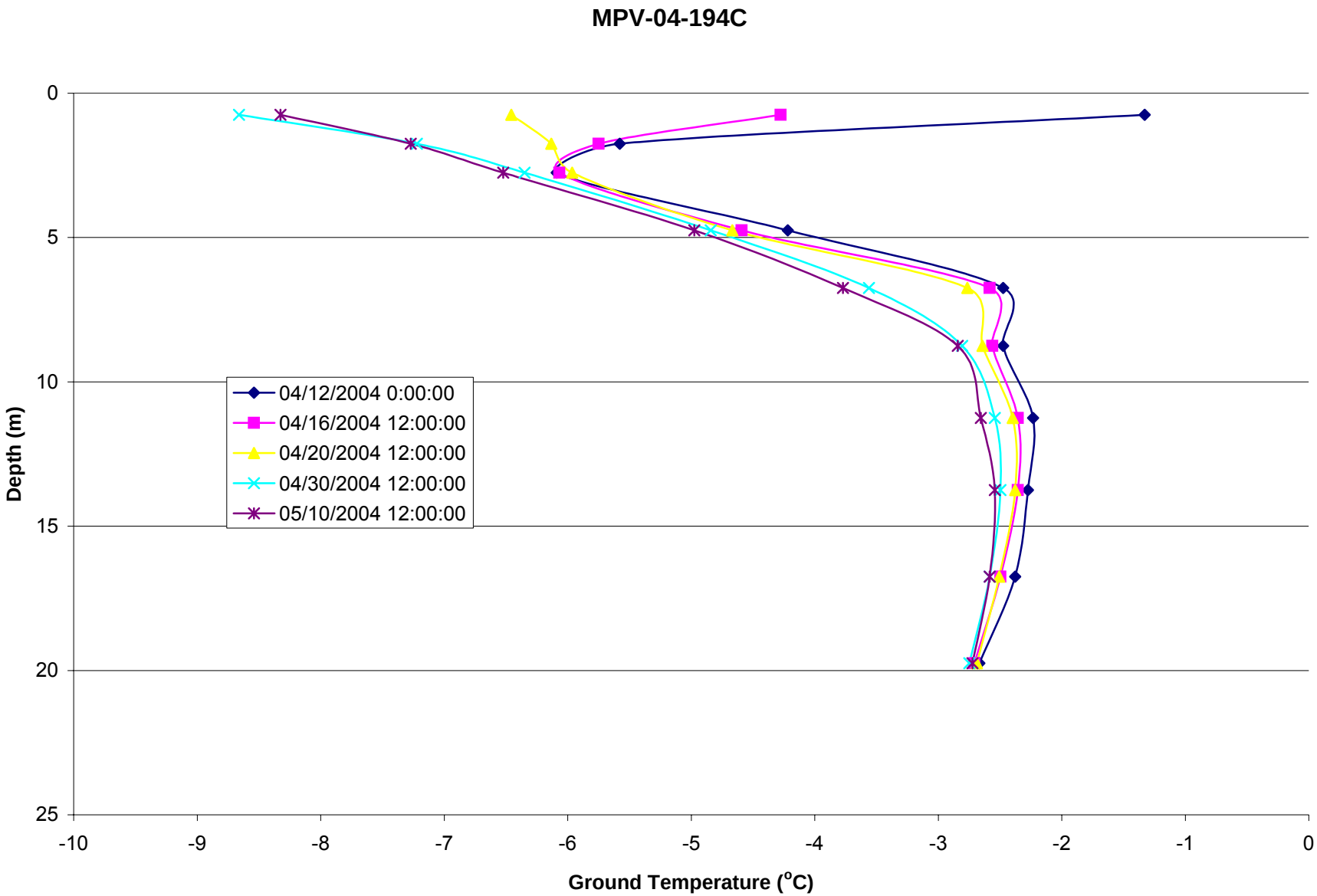
JOINT ALTERATION	
CODE	*DESCRIPTION*
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE



	Laubscher	Jr	JRC
ROUGH	1	4	20
SMOOTH	2	3	14
SLICKEN-SIDED	3	2	11
ROUGH	4	3	14
SMOOTH	5	2	11
SLICKEN-SIDED	6	1.5	7
ROUGH	7	1.5	2.5
SMOOTH	8	2	1.5
SLICKEN-SIDED	9	0.5	0.5

SRK STEFFEN, ROBERTSON AND KIRSTEN
Consulting Engineers


MPV-04-194C
Depth (m)
0
5
10
15
20
25
-10
-9
-8
-7
-6
-5
-4
-3
-2
-1
0
Ground Temperature (°C)
04/12/2004 0:00:00
04/16/2004 12:00:00
04/20/2004 12:00:00
04/30/2004 12:00:00
05/10/2004 12:00:00

MPV_04_194C

MPV_04_194C

MPV_04_194C

FIELD DRILL PERFORMANCE LOG

PROJECT:	Gahcho Kue Geotech
PROJECT NO:	VM00351.H7

HOLE NO:	**MPV-04-195**
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	04/08/2004 19:00
DATE AND TIME FINISHED:	04/09/2004 19:00
HOLE DIAMETER (mm):	148.0 / 75.8 (SQ / NQ)
CORE DIAMETER (mm):	101.6 / 47.6 (SQ / NQ)

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
NS 1900-0700	S Fortin	04/09/2004	07:00	12.0	11.0	0.6	Set up at BH C-PS-1 T / MVP-04-195	0.6	0.5	1.20				
DS 0700-1900	K Barnes	04/09/2004	19:00	12.0	6.0	18.00	wrong SQ/NQ sub; replace core barrel	17.4	6	2.90	12	6	6	3.00
NS 1900-0700	S Fortin	04/10/2004	07:00	12.0	10.0	20.50	change oil; prepare rig for move	2.5	2	1.25	24	16	8	2.56

OVERALL HOLE DRILL RATE (m/hr)	0.57
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	2.41

GENERAL GEOTECHNICAL LOG

DRILLHOLE ID: **MPV-04-195**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	IRS STRONG R	IRS WEAK R	IRS % WEAK	COMMENT
0.00	0.60	0.60	Air										from the bit, no geobor; depths relative to drill table 0.6m above ground
0.60	1.26	0.66	OB	0.30	45.5								
1.26	2.20	0.94	OB	0.94	100.0								
2.20	2.52	0.32	Gneiss	0.32	100.0								Recovered from Geobor - not logged
2.52	6.00	3.48	Gneiss	3.45	99.1	3.39	97.4	3.22	92.5	5	4	0	
6.00	9.00	3.00	Gneiss	3.00	100.0	2.29	76.3	2.05	68.3	5	4	5	
9.00	12.00	3.00	Gneiss	3.00	100.0	3.00	100.0	3.00	100.0	5	4	0	
12.00	15.00	3.00	Gneiss	3.00	100.0	3.00	100.0	2.93	97.7	5	4	0	competent granite (no joints); uniform x-talline structure; biotite-rich;
15.00	18.00	3.00	Gneiss	3.00	100.0	3.00	100.0	2.81	93.7	4		0	- semi-curved fresh 45° fracture at 15.52m (rough surface);
													- fracture oriented 70° at 16.5m, rough/fresh
													as above; smooth, fresh planar fracture at 19.25m with greasy infill;
18.00	20.50	2.50	Gneiss	2.50	100.0	2.50	100.0	2.41	96.4	4		0	- competent granite with no joints
		0.00											Thermistor inslalled on completion
		0.00											
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AMEC Photo Log Sheet

Drillhole ID: **MPV-04-195**

Shift	Camera Photo Number	Filename	Depth (m)	Description
DS 0700-1900	DSCN2640	MPV-04-195C_00.60m_Dry_1	0.60 - 1.90	Pictures overlap as cores were combined
DS 0700-1900	DSCN2641	MPV-04-195C_01.40m_Dry_2	1.40 - 2.52	Pictures overlap as cores were combined
DS 0700-1900	DSCN1737	MPV-04-195C_02.52m_Dry_3	2.52 - 6.71	
DS 0700-1900	DSCN1738	MPV-04-195C_06.71m_Dry_4	6.71 - 10.92	
DS 0700-1900	DSCN1739	MPV-04-195C_10.92m_Dry_5	10.92 - 15.00	
NS 1900-0700	DSCN1740	MPV-04-195C_15.00m_Dry_6	15.00 - 19.35	
NS 1900-0700	DSCN1741	MPV-04-195C_19.35m_Dry_7	19.35 - 20.50	

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-195	1	0.60	1.20
MPV-04-195	2	1.20	2.52
MPV-04-195	3	2.52	6.71
MPV-04-195	4	6.71	10.92
MPV-04-195	5	10.92	15.00
MPV-04-195	6	15.00	19.35
MPV-04-195	7	19.35	20.50
	8	20.50	
	9		
	10		
	11		
	12		
	13		
	14		
	15		
	16		
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	30		

GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	*DESCRIPTION*	*Mpa*
R0	**EXTREMELY WEAK ROCK**	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	**VERY WEAK ROCK**	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	**WEAK ROCK**	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	**MEDIUM STRONG ROCK**	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	**STRONG ROCK**	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	**VERY STRONG ROCK**	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	**EXTREMELY STRONG ROCK**	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY	
CODE	*DESCRIPTION*
0	NONE
1	MINOR
2	MODERATE
3	HEAVY

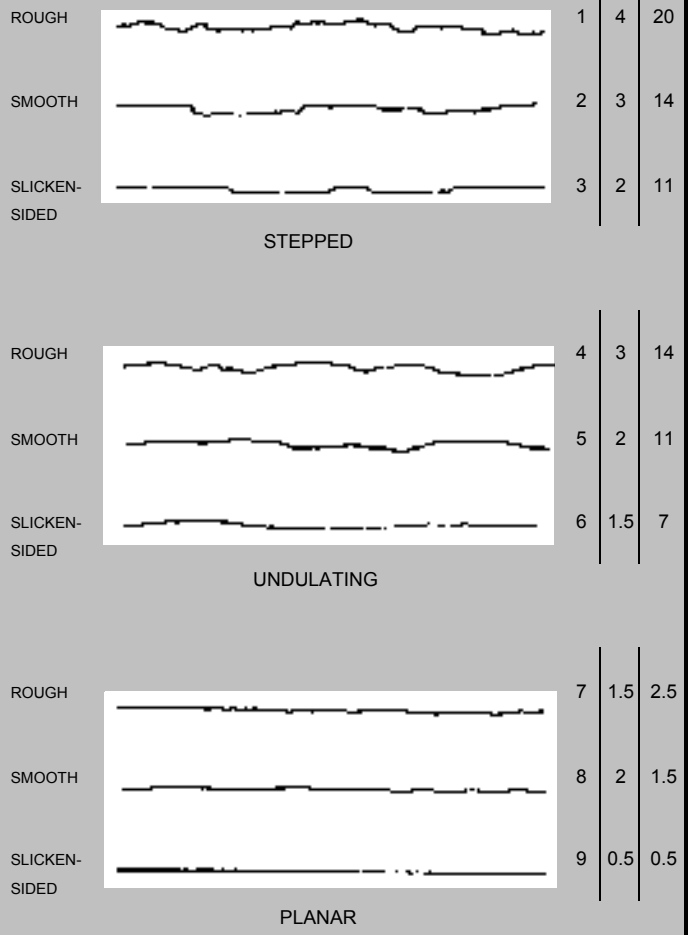
DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	*CATEGORY*
0	STRONG (NEVER BREAKS)
1	MODERATE (SOMETIMES BREAKS)
3	WEAK (ALWAYS BREAKS)

JOINT CONDITION - SMALL SCALE		
CODE	*CATEGORY*	*SUBCATEGORY*
1	STEPPED	ROUGH
2		SMOOTH
3		SLICKENSIDED
4	UNDULATING	ROUGH
5		SMOOTH
6		SLICKENSIDED
7	PLANAR	ROUGH
8		SMOOTH
9		SLICKENSIDED

JOINT FILLING		
CODE	*CATEGORY*	*SUBCATEGORY*
1	NON	COARSE
2	SOFTENING	MEDIUM
3		FINE
4	SOFT	COARSE
5	SHEARED	MEDIUM
6		FINE
7	GOUGE THIKNESS < IRREGULARITIES	
8	GOUGE THIKNESS > IRREGULARITIES	
9	NO INFILL	

JOINT ALTERATION	
CODE	*DESCRIPTION*
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE



	Laubscher	Jr	JRC
ROUGH	1	4	20
SMOOTH	2	3	14
SLICKEN-SIDED	3	2	11
ROUGH	4	3	14
SMOOTH	5	2	11
SLICKEN-SIDED	6	1.5	7
ROUGH	7	1.5	2.5
SMOOTH	8	2	1.5
SLICKEN-SIDED	9	0.5	0.5

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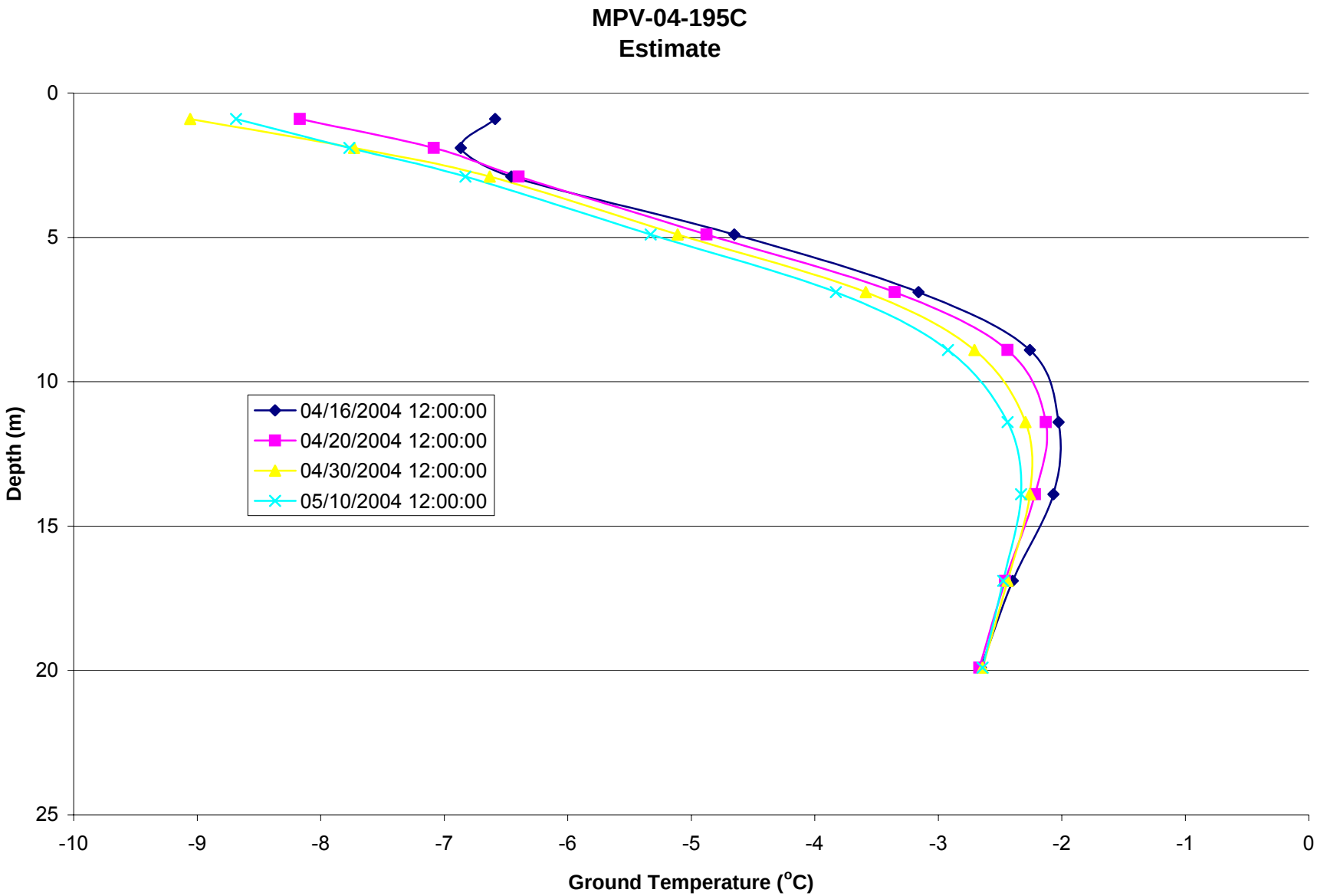
Consulting Engineers


MPV-04-195C
Estimate
Depth (m)
0
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10
15
20
25
-10
-9
-8
-7
-6
-5
-4
-3
-2
-1
0
Ground Temperature (°C)
04/16/2004 12:00:00
04/20/2004 12:00:00
04/30/2004 12:00:00
05/10/2004 12:00:00

MPV_04_195C


MPV-04
195
0.6
120


MPV-04
195


MPV-04-195
Box 3
252-671
C-04-017
252
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MPV_04_195C

MPV_04_195C

FIELD DRILL PERFORMANCE LOG

PROJECT:	Gahcho Kue Geotech
PROJECT NO:	VM00351.H7

HOLE NO:	**MPV-04-197**
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	04/10/2004 19:00
DATE AND TIME FINISHED:	04/11/2004 7:00
HOLE DIAMETER (mm):	148.0 / 75.8 (SQ / NQ)
CORE DIAMETER (mm):	101.6 / 47.6 (SQ / NQ)

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
DS 0700-1900	K Barnes	04/10/2004	07:00	12.0	12.0	0.0	Set up at MVP-04-197		0	0.00	12	12	0	0.00
NS 1900-0700	S Fortin	04/11/2004	07:00	12.0	3.5	20.5	replace bit at 10.0 m, demob,	20.5	8.5	2.41	24	15.5	8.5	2.41
DS 0700-1900	K Barnes	04/11/2004	07:00	12.0	12.0	20.5	Demob from MVP-04-197	0	0	0.00	36	27.5	8.5	2.41

OVERALL HOLE DRILL RATE (m/hr)	0.57
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	2.41

GENERAL GEOTECHNICAL LOG

DRILLHOLE ID: **MPV-04-197**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	IRS STRONG R	IRS WEAK R	IRS % WEAK	COMMENT
0.00	0.85	0.85	Air										
0.85	1.45	0.60	OB	0.60	100.0								
1.45	2.75	1.30	Gneiss	0.00	0.0								No Recovery - installed casing
2.75	5.85	3.10	Gneiss	3.10	100.0	3.00	96.8	2.86	92.3	5	4	0	
5.85	8.95	3.10	Gneiss	3.10	100.0	3.10	100.0	2.98	96.1	5	4	0	
8.95	9.90	0.95	Gneiss	0.95	100.0	0.90	94.7	0.90	94.7	5	4	0	
9.90	12.00	2.10	Gneiss	2.10	100.0	2.10	100.0	2.10	100.0	5	4	0	
12.00	15.00	3.00	Gneiss	3.00	100.0	3.00	100.0	3.00	100.0	5	4	0	
15.00	18.00	3.00	Gneiss	2.94	98.0	2.94	98.0	2.89	96.3	5	4	0	
18.00	20.70	2.70	Gneiss	2.70	100.0	2.70	100.0	2.70	100.0	5	4	0	Thermistor installed on completion
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AMEC Photo Log Sheet

Drillhole ID: **MPV-04-197**

Shift	Camera Photo Number	Filename	Depth (m)	Description
NS 1900-0700	DSCN 2643	MPV-04-197C_00.85_Dry_1	0.85 - 1.45	
NS 1900-0700	DSCN 1742	MPV-04-197C_02.75_Dry_2	2.75 - 5.85	
NS 1900-0700	DSCN 1743	MPV-04-197C_05.85_Dry_3	5.85 - 9.90	
NS 1900-0700	DSCN 1744	MPV-04-197C_09.90_Dry_4	9.90 - 14.25	
NS 1900-0700	DSCN 1745	MPV-04-197C_14.25_Dry_5	14.25 - 18.00	
NS 1900-0700	DSCN 1748	MPV-04-197C_18.00_Dry_6	18.00 - 20.70	

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-197	1	0.85	1.45
MPV-04-197	2	2.75	5.85
MPV-04-197	3	5.85	9.90
MPV-04-197	4	9.90	14.25
MPV-04-197	5	14.25	18.00
MPV-04-197	6	18.00	20.70
	7	20.70	
	8		
	9		
	10		
	11		
	12		
	13		
	14		
	15		
	16		
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	26		
	27		
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	29		
	30		

GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	*DESCRIPTION*	*Mpa*
R0	**EXTREMELY WEAK ROCK**	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	**VERY WEAK ROCK**	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	**WEAK ROCK**	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	**MEDIUM STRONG ROCK**	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	**STRONG ROCK**	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	**VERY STRONG ROCK**	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	**EXTREMELY STRONG ROCK**	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY	
CODE	*DESCRIPTION*
0	NONE
1	MINOR
2	MODERATE
3	HEAVY

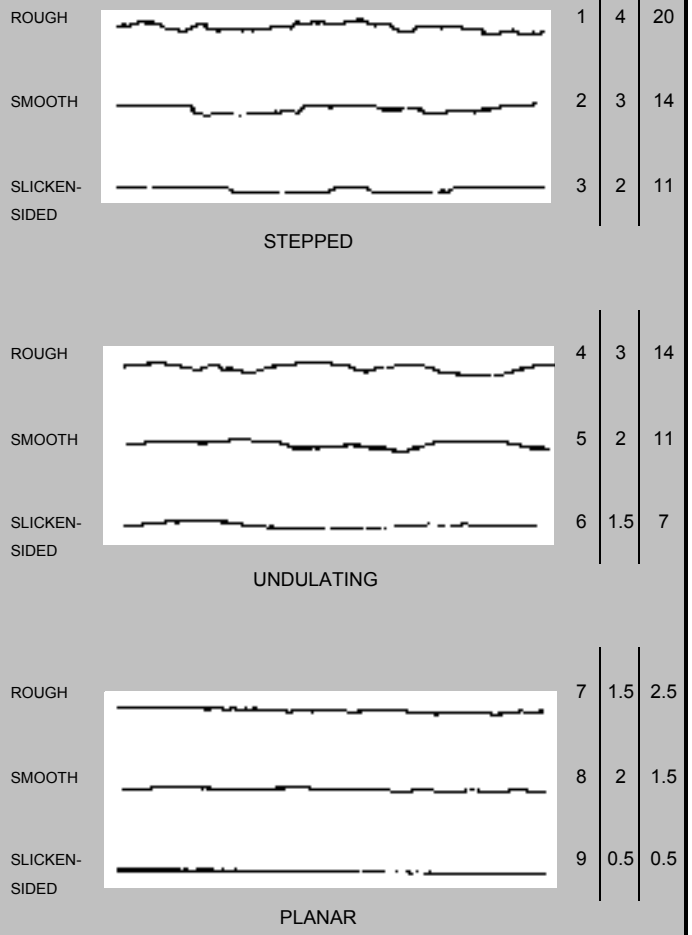
DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	*CATEGORY*
0	STRONG (NEVER BREAKS)
1	MODERATE (SOMETIMES BREAKS)
3	WEAK (ALWAYS BREAKS)

JOINT CONDITION - SMALL SCALE		
CODE	*CATEGORY*	*SUBCATEGORY*
1	STEPPED	ROUGH
2		SMOOTH
3		SLICKENSIDED
4	UNDULATING	ROUGH
5		SMOOTH
6		SLICKENSIDED
7	PLANAR	ROUGH
8		SMOOTH
9		SLICKENSIDED

JOINT FILLING		
CODE	*CATEGORY*	*SUBCATEGORY*
1	NON	COARSE
2	SOFTENING	MEDIUM
3		FINE
4	SOFT	COARSE
5	SHEARED	MEDIUM
6		FINE
7	GOUGE THIKNESS < IRREGULARITIES	
8	GOUGE THIKNESS > IRREGULARITIES	
9	NO INFILL	

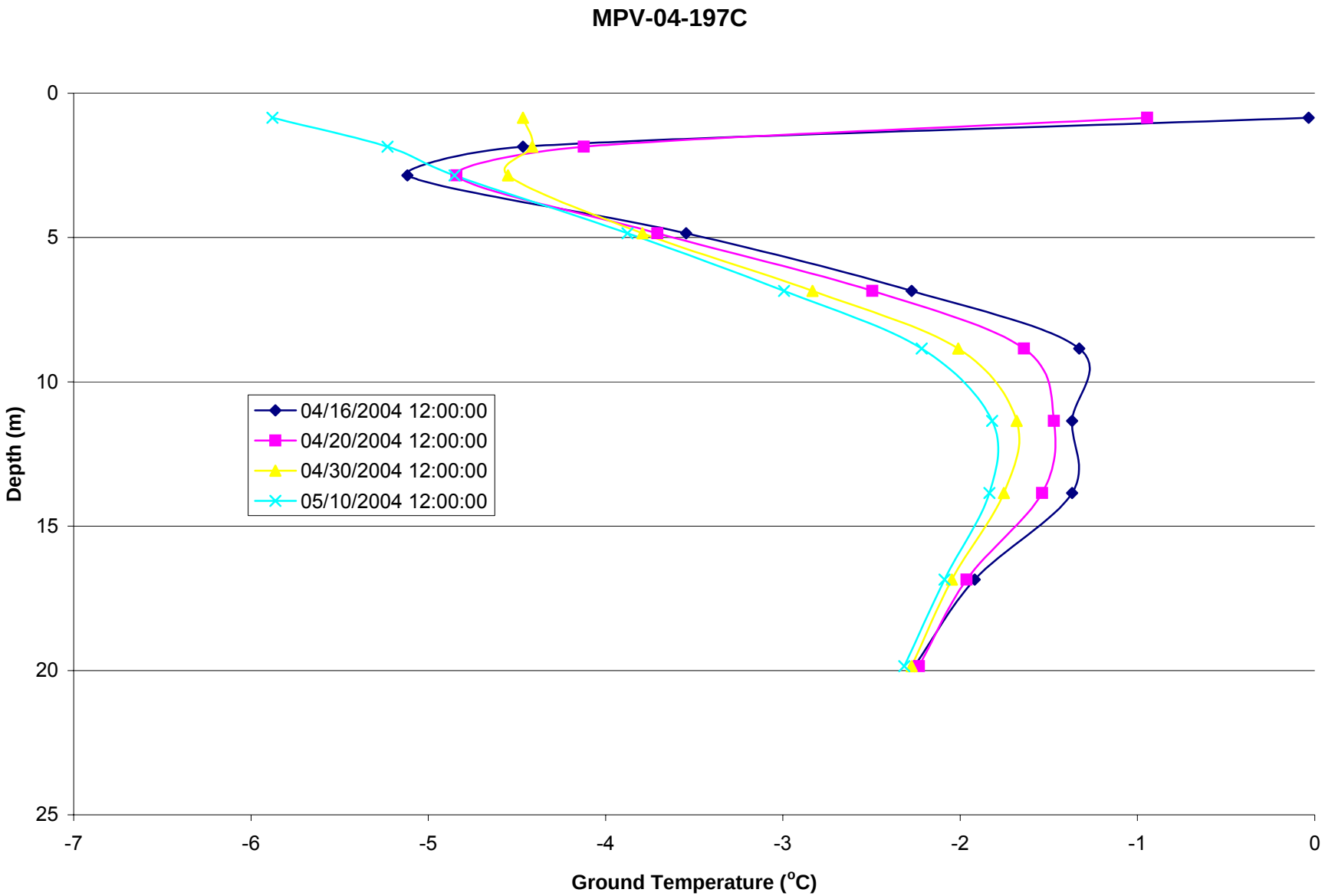
JOINT ALTERATION	
CODE	*DESCRIPTION*
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE



	Laubscher	Jr	JRC
ROUGH	1	4	20
SMOOTH	2	3	14
SLICKEN-SIDED	3	2	11
ROUGH	4	3	14
SMOOTH	5	2	11
SLICKEN-SIDED	6	1.5	7
ROUGH	7	1.5	2.5
SMOOTH	8	2	1.5
SLICKEN-SIDED	9	0.5	0.5

SRK STEFFEN, ROBERTSON AND KIRSTEN
Consulting Engineers


MPV-04-197C
Depth (m)
0
5
10
15
20
25
-7
-6
-5
-4
-3
-2
-1
0
Ground Temperature (°C)
04/16/2004 12:00:00
04/20/2004 12:00:00
04/30/2004 12:00:00
05/10/2004 12:00:00

MPV_04_197C

MPV_04_197C

amec

FIELD DRILL PERFORMANCE LOG

PROJECT:	Gahcho Kue Geotech
PROJECT NO:	VM00351.H7

HOLE NO:	**MPV-04-198**
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	04/11/2004 19:00
DATE AND TIME FINISHED:	04/12/2004 19:00
HOLE DIAMETER (mm):	148.0 / 75.8 (SQ / NQ)
CORE DIAMETER (mm):	101.6 / 47.6 (SQ / NQ)

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
DS 0700-1900	K Barnes	04/11/2004	07:00	12.0	12.0	0	Demob from MPV-04-197 / Mob to MPV-04-198		0	0.00	12	12	0	0.00
NS 1900-0700	S Fortin	04/12/2004	07:00	12.0	10.5	2.90	Prepare for survival shack, whiteout	2.9	1.5	1.93	24	22.5	1.5	1.93
DS 0700-1900	K Barnes	04/12/2004	07:00	12.0	4.0	21	Demob from MPV-04-198 / Mob to MPV-04-201	18.1	8	2.26	36	26.5	9.5	2.21

OVERALL HOLE DRILL RATE (m/hr)	0.58
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	2.21

GENERAL GEOTECHNICAL LOG

DRILLHOLE ID: **MPV-04-198**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	IRS STRONG R	IRS WEAK R	IRS % WEAK	COMMENT
0.00	1.00	1.00	Air										
1.00	2.25	1.25	OB										
2.25	2.75	0.50	Gneiss										
2.75	2.90	0.15	Gneiss	0.15	100.0								
2.90	3.20	0.30	Gneiss	0.00									No recovery due to installation of casing
3.20	6.00	2.80	Gneiss	2.80	100.0	2.64	94.3	2.03	72.5	R5	R4	0	
6.00	9.00	3.00	Gneiss	2.95	98.3	2.78	92.7	2.55	85.0	R5	R4	0	
9.00	12.00	3.00	Gneiss	2.95	98.3	2.47	82.3	1.64	54.7	R5	R4	0	
12.00	15.00	3.00	Gneiss	3.00	100.0	3.00	100.0	2.71	90.3	R5	R4	0	
15.00	18.00	3.00	Gneiss	3.00	100.0	2.98	99.3	2.45	81.7	R5	R4	0	
18.00	21.00	3.00	Gneiss	3.00	100.0	2.71	90.3	2.45	81.7	R5	R4	0	Thermistor installed on completion
		0.00											
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AMEC Photo Log Sheet

Drillhole ID: **MPV-04-198**

Shift	Camera Photo Number	Filename	Depth (m)	Description
DS 0700-1900	DSCN2644	MVP-04-198C_01.25_Dry_1	1.25 - 2.1	Photos overlap because core combined
DS 0700-1900	DSCN2645	MVP-04-198C_01.95_Dry_1b	1.95 - 2.75	Photos overlap because core combined
DS 0700-1900	DSCN2646	MVP-04-198C_02.45_Dry_2	2.45 - 2.90	Photos overlap because core combined
DS 0700-1900	DSCN1751	MVP-04-198C_03.20_Dry_3	3.20 - 7.27	
DS 0700-1900	DSCN1752	MVP-04-198C_07.27_Dry_4	7.27 - 11.52	
DS 0700-1900	DSCN1753	MVP-04-198C_11.52_Dry_5	11.52 - 15.56	
DS 0700-1900	DSCN1754	MVP-04-198C_15.56_Dry_6	15.56 - 19.75	
DS 0700-1900	DSCN1755	MVP-04-198C_19.75_Dry_7	19.75 - 21.00	

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-198	1	1.25	2.75
MPV-04-198	2	2.75	2.90
MPV-04-198	3	3.20	7.27
MPV-04-198	4	7.27	11.52
MPV-04-198	5	11.52	15.56
MPV-04-198	6	15.56	19.75
MPV-04-198	7	19.75	21.00
	8	21.00	
	9		
	10		
	11		
	12		
	13		
	14		
	15		
	16		
	17		
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	28		
	29		
	30		

GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	*DESCRIPTION*	*Mpa*
R0	**EXTREMELY WEAK ROCK**	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	**VERY WEAK ROCK**	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	**WEAK ROCK**	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	**MEDIUM STRONG ROCK**	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	**STRONG ROCK**	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	**VERY STRONG ROCK**	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	**EXTREMELY STRONG ROCK**	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY	
CODE	*DESCRIPTION*
0	NONE
1	MINOR
2	MODERATE
3	HEAVY

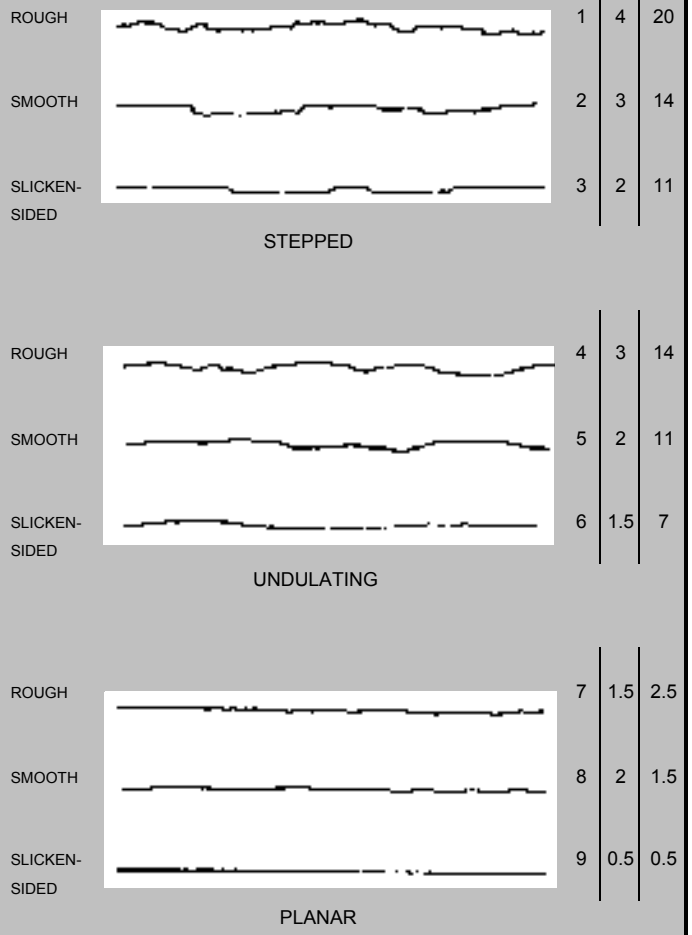
DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	*CATEGORY*
0	STRONG (NEVER BREAKS)
1	MODERATE (SOMETIMES BREAKS)
3	WEAK (ALWAYS BREAKS)

JOINT CONDITION - SMALL SCALE		
CODE	*CATEGORY*	*SUBCATEGORY*
1	STEPPED	ROUGH
2		SMOOTH
3		SLICKENSIDED
4	UNDULATING	ROUGH
5		SMOOTH
6		SLICKENSIDED
7	PLANAR	ROUGH
8		SMOOTH
9		SLICKENSIDED

JOINT FILLING		
CODE	*CATEGORY*	*SUBCATEGORY*
1	NON	COARSE
2	SOFTENING	MEDIUM
3		FINE
4	SOFT	COARSE
5	SHEARED	MEDIUM
6		FINE
7	GOUGE THIKNESS < IRREGULARITIES	
8	GOUGE THIKNESS > IRREGULARITIES	
9	NO INFILL	

JOINT ALTERATION	
CODE	*DESCRIPTION*
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE



	Laubscher	Jr	JRC
ROUGH	1	4	20
SMOOTH	2	3	14
SLICKEN-SIDED	3	2	11
ROUGH	4	3	14
SMOOTH	5	2	11
SLICKEN-SIDED	6	1.5	7
ROUGH	7	1.5	2.5
SMOOTH	8	2	1.5
SLICKEN-SIDED	9	0.5	0.5

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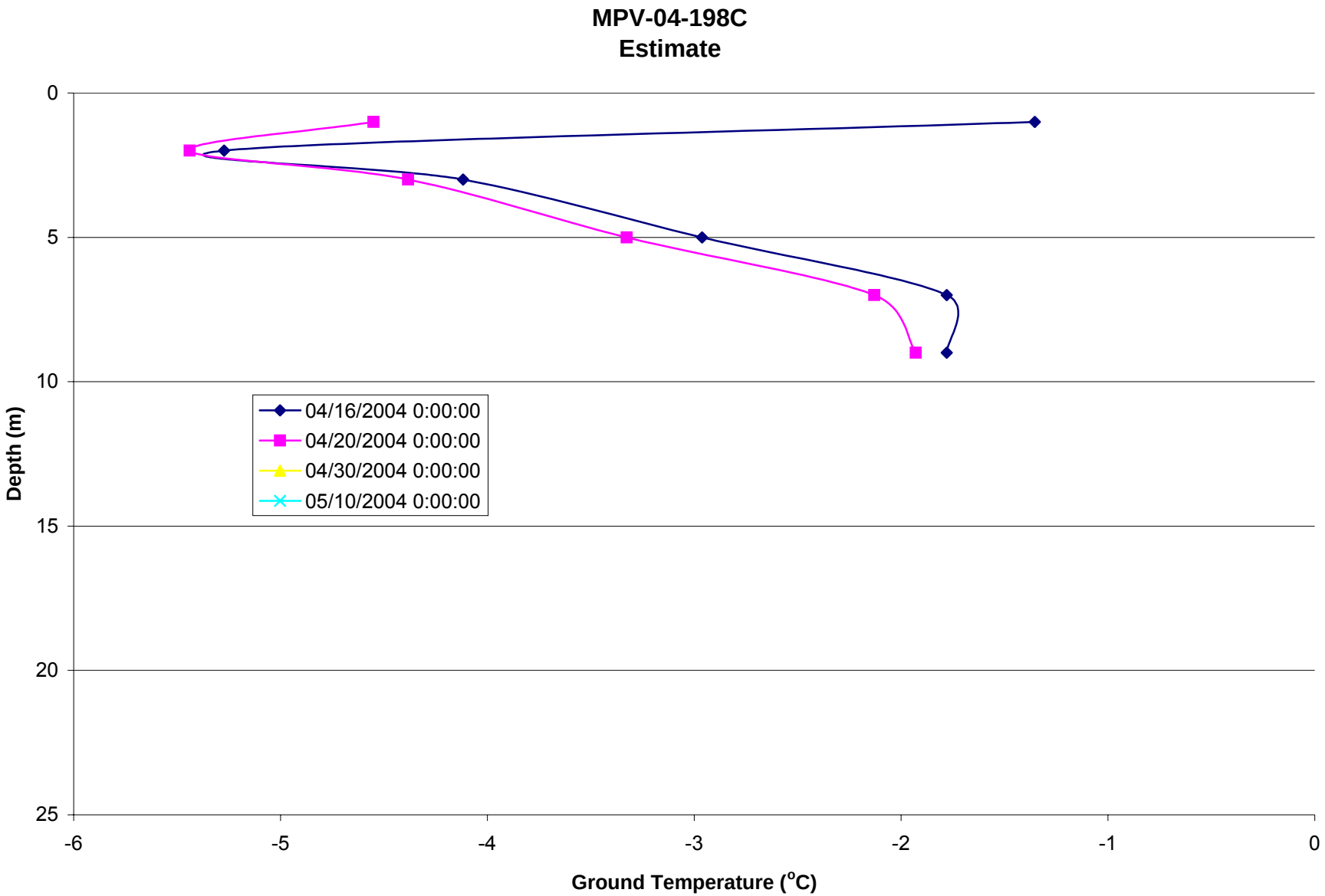
MPV-04-198C
Estimate
0
5
10
15
20
25
Depth (m)
-6
-5
-4
-3
-2
-1
0
Ground Temperature (°C)
04/16/2004 0:00:00
04/20/2004 0:00:00
04/30/2004 0:00:00
05/10/2004 0:00:00

MPV_04_198C

MPV_04_198C


MPV-04-198
Box 5
Depth (m) 727
727


MPV-04-198
Box 4
727-752
MPV-04-198
Box 4
Depth 727-752
727
752


MPV-04-198 Box
Date: 12 April 2004
Depth (m)
12
15

MPV_04_198C

FIELD DRILL PERFORMANCE LOG

PROJECT:	Gahcho Kue Geotech
PROJECT NO:	VM00351.H7

HOLE NO:	**MPV-04-201**
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	04/13/2004 7:00
DATE AND TIME FINISHED:	04/14/2004 7:00
HOLE DIAMETER (mm):	148.0 / 75.8 (SQ / NQ)
CORE DIAMETER (mm):	101.6 / 47.6 (SQ / NQ)

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
DS 0700-1900	K Barnes	04/13/2004	19:00	12.0	12.0	0.0	Demob from MVP-04-198 / Mob to MPV-04-201		0	0.00	12	12	0.0	0.00
NS 1900-0700	L Sampson	04/14/2004	07:00	12.0	12.0	0.0	Demob from MVP-04-198 / Mob to MPV-04-201		0.0	0.00	24	23.99	0.0	0.00
DS 0700-1900	L Sampson	04/14/2004	19:00	12.0	0.0	22		22	12	1.83	36	23.99	12.0	1.83

OVERALL HOLE DRILL RATE (m/hr)	0.61
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	1.83

GENERAL GEOTECHNICAL LOG

DRILLHOLE ID: **MPV-04-201**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	IRS			COMMENT
										STRONG R	WEAK R	% WEAK	
0.00	1.20	1.20	Air										
1.20	2.61	1.41	OB/BR										Set Casing, no recovery. (assume bedrock at 2.5 m)
2.61	6.00	3.39	Gneiss	3.00	88.5	2.34	69.0	2.11	62.2	5	4	0	
6.00	9.00	3.00	Gneiss	3.00	100.0	2.43	81.0	2.22	74.0	5	4	0	
9.00	12.00	3.00	Gneiss	2.96	98.7	2.65	88.3	2.40	80.0	5	4	0	
12.00	15.00	3.00	Gneiss	2.98	99.3	2.51	83.7	2.45	81.7	5	4	0	
15.00	18.00	3.00	Gneiss	2.99	99.7	2.51	83.7	2.36	78.7	5	4	0	
18.00	21.00	3.00	Gneiss	3.00	100.0	2.74	91.3	2.33	77.7	5	4	0	
21.00	22.00	1.00	Gneiss	1.00	100.0	0.51	51.0	0.45	45.0	5	4	0	Thermistor installed on completion
		0.00											
		0.00											
		0.00											
		0.00											
		0.00											
		0.00											
		0.00											
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		0.00											

AMEC Photo Log Sheet

Drillhole ID: **MPV-04-201**

Shift	Camera Photo Number	Filename	Depth (m)	Description
DS 0700-1900	DSCN1768	MPV-04-201C_02.61_Dry_1	2.61 - 6.91	
DS 0700-1900	DSCN1769	MPV-04-201C_06.91_Dry_2	6.91 - 11.15	
DS 0700-1900	DSCN1770	MPV-04-201C_11.15_Dry_3	11.15 - 15.41	
DS 0700-1900	DSCN1771	MPV-04-201C_15.41_Dry_4	15.41 - 19.67	
DS 0700-1900	DSCN1772	MPV-04-201C_19.67_Dry_5	19.67 - 22.00	

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-201	1	2.61	6.91
MPV-04-201	2	6.91	11.15
MPV-04-201	3	11.15	15.41
MPV-04-201	4	15.41	19.67
MPV-04-201	5	19.67	22.00
	6	22.00	
	7		
	8		
	9		
	10		
	11		
	12		
	13		
	14		
	15		
	16		
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	29		
	30		

GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	*DESCRIPTION*	*Mpa*
R0	**EXTREMELY WEAK ROCK**	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	**VERY WEAK ROCK**	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	**WEAK ROCK**	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	**MEDIUM STRONG ROCK**	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	**STRONG ROCK**	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	**VERY STRONG ROCK**	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	**EXTREMELY STRONG ROCK**	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY	
CODE	*DESCRIPTION*
0	NONE
1	MINOR
2	MODERATE
3	HEAVY

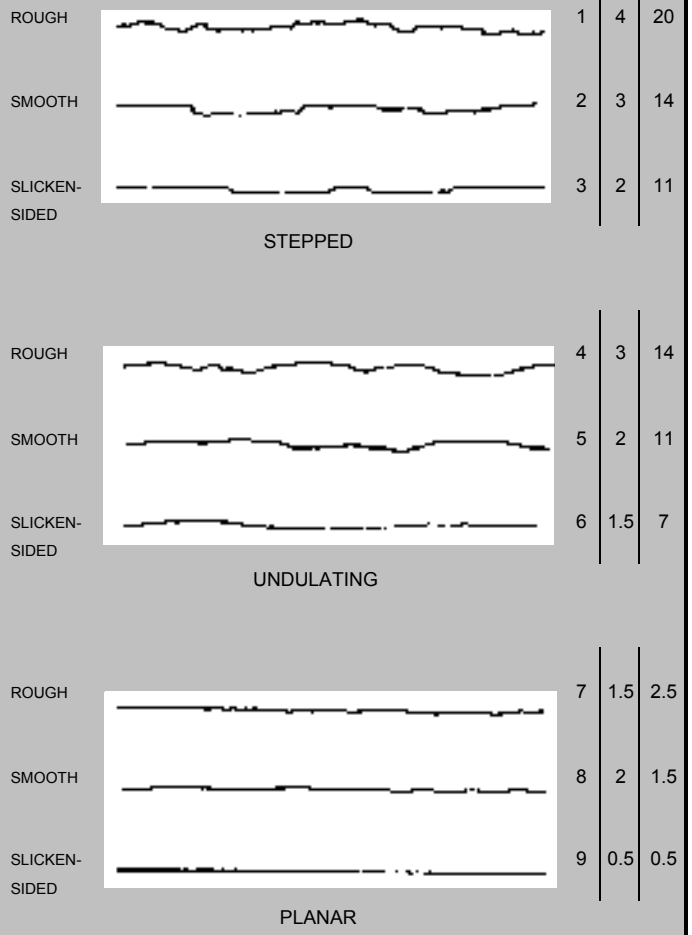
DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	*CATEGORY*
0	STRONG (NEVER BREAKS)
1	MODERATE (SOMETIMES BREAKS)
3	WEAK (ALWAYS BREAKS)

JOINT CONDITION - SMALL SCALE		
CODE	*CATEGORY*	*SUBCATEGORY*
1	STEPPED	ROUGH
2		SMOOTH
3		SLICKENSIDED
4	UNDULATING	ROUGH
5		SMOOTH
6		SLICKENSIDED
7	PLANAR	ROUGH
8		SMOOTH
9		SLICKENSIDED

JOINT FILLING		
CODE	*CATEGORY*	*SUBCATEGORY*
1	NON	COARSE
2	SOFTENING	MEDIUM
3		FINE
4	SOFT	COARSE
5	SHEARED	MEDIUM
6		FINE
7	GOUGE THIKNESS < IRREGULARITIES	
8	GOUGE THIKNESS > IRREGULARITIES	
9	NO INFILL	

JOINT ALTERATION	
CODE	*DESCRIPTION*
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE



	Laubscher	Jr	JRC
ROUGH	1	4	20
SMOOTH	2	3	14
SLICKEN-SIDED	3	2	11
ROUGH	4	3	14
SMOOTH	5	2	11
SLICKEN-SIDED	6	1.5	7
ROUGH	7	1.5	2.5
SMOOTH	8	2	1.5
SLICKEN-SIDED	9	0.5	0.5

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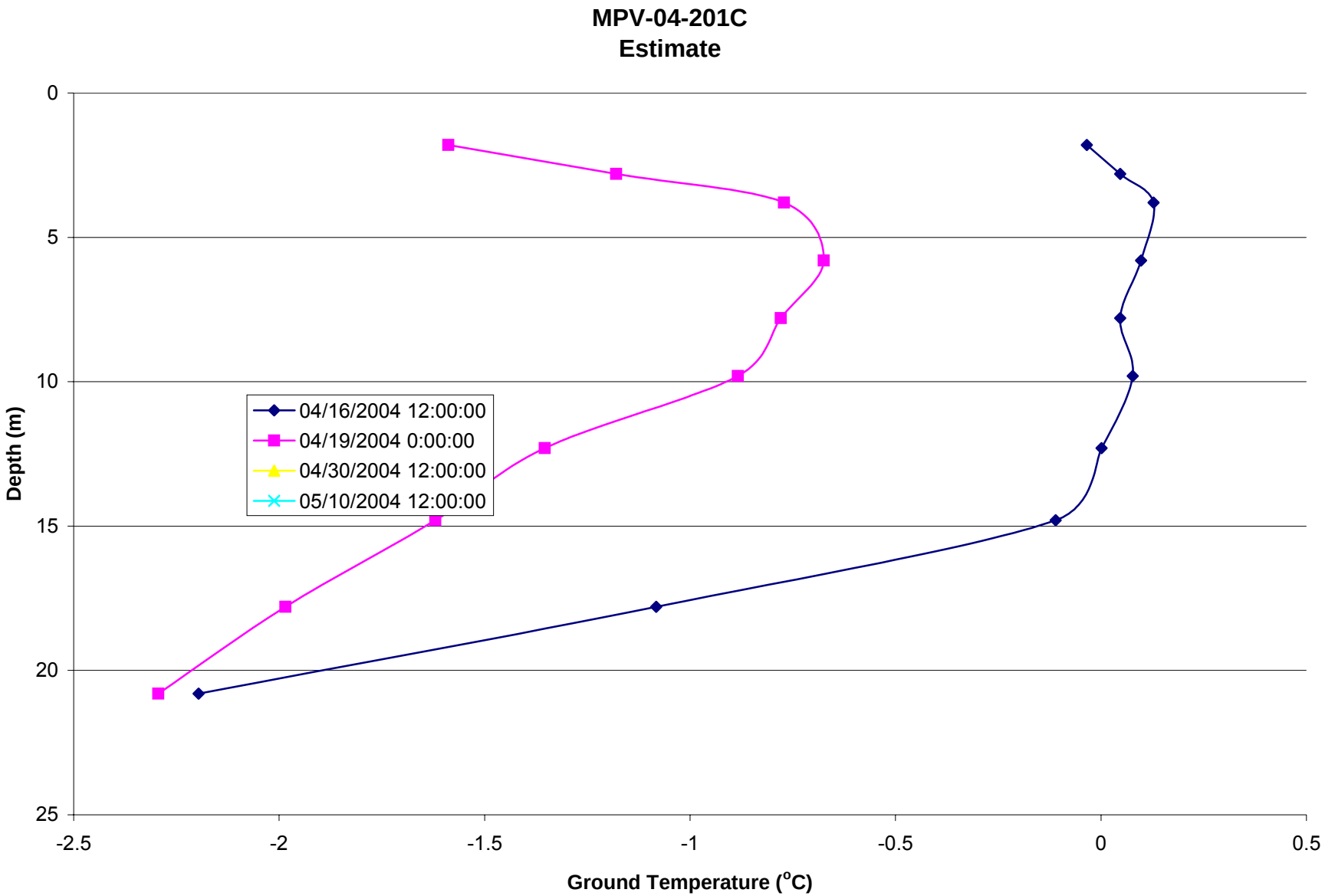
MPV-04-201C
Estimate
Depth (m)
0
5
10
15
20
25
-2.5
-2
-1.5
-1
-0.5
0
0.5
Ground Temperature (°C)
04/16/2004 12:00:00
04/19/2004 0:00:00
04/30/2004 12:00:00
05/10/2004 12:00:00

MPV_04_201C


MPV-04-201
Box 1
Depth (m) 2.61-4.91


MPV-04-201
Box 2
Depth (m) 6.91-11.15
9


MPV-04-201
Box 3
Depth (m) 11.15-15.41
12
15

MPV_04_201C

FIELD DRILL PERFORMANCE LOG

PROJECT:	Gahcho Kue Geotech
PROJECT NO:	VM00351.H7

HOLE NO:	**MPV-04-204**
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	04/30/2004 7:00
DATE AND TIME FINISHED:	04/30/2004 7:00
HOLE DIAMETER (mm):	148.0 / 96.1 (SQ / HQ)
CORE DIAMETER (mm):	101.6 / 63.5 (SQ / HQ)

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
DS 0700-1900	K Barnes	04/30/2004	19:00	12.0	6.0	5.6	Mob to MPV-04-204	5.60	6	0.93	12	6	6	0.00
NS 1900-0700	K Barnes	05/01/2004	07:00	12.0	7.0	11.5	Demob from MPV-04-204 / Mob to MPV-04-205	5.90	5	1.18	24	13	11	1.05

OVERALL HOLE DRILL RATE (m/hr)	0.48
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	1.05

GENERAL GEOTECHNICAL LOG

DRILLHOLE ID: **MPV-04-204**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	IRS STRONG R	IRS WEAK R	IRS % WEAK	COMMENT
0.00	0.55	0.55											
0.55	0.85	0.30	OB										
0.85	2.35	1.50	OB	0.15	10.0								
2.35	3.65	1.30	OB	0.90	69.2								
3.65	4.60	0.95	OB	0.65	68.4								
4.60	5.50	0.90	OB	0.45	50.0								
5.50	7.00	1.50	Gneiss	1.86	124.0	0.95	63.3	0.71	47.3	5	4	0	Sulfide deposits (10 to 30 mm)
7.00	8.50	1.50	Gneiss	1.50	100.0	1.48	98.7	1.30	86.7	5	4	0	Sulfide deposits (10 to 30 mm)
8.50	10.00	1.50	Gneiss	1.50	100.0	1.47	98.0	1.37	91.3	5	4	0	Sulfide deposits (10 to 30 mm)
10.00	11.50	1.50	Gneiss	1.50	100.0	1.20	80.0	1.20	80.0	5	4	0	Sulfide deposits (10 to 30 mm)
		0.00											
		0.00											
		0.00											
		0.00											
		0.00											
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AMEC Photo Log Sheet

Drillhole ID: **MPV-04-204**

Shift	Camera Photo Number	Filename	Depth (m)	Description
DS 0700-1900	DSCN2655	MPV-04-204C_00.55_Dry_1	0.55 - 0.85	
DS 0700-1900	DSCN2659	MPV-04-204C_00.85_Dry_2	0.85 - 1.85	
DS 0700-1900	DSCN2661	MPV-04-204C_01.55_Dry_3	1.55 - 2.35	
DS 0700-1901	DSCN2664	MPV-04-204C_02.35_Dry_4	2.35 - 3.85	
DS 0700-1902	DSCN2665	MPV-04-204C_03.85_Dry_5	3.85 - 5.60	
DS 0700-1902	DSCN2668	MPV-04-204C_03.85_Dry_5b	3.85 - 5.60	
DS 0700-1900	DSCN1785	MPV-04-204C_05.05_Dry_6	5.05 - 7.00	Sample overlap due to sloughing during casing installation
DS 0700-1900	DSCN1784	MPV-04-204C_07.00_Dry_7	7.00 - 9.80	
DS 0700-1900	DSCN1783	MPV-04-204C_09.80_Dry_8	9.80 - 11.5	

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-204	1	**0.55**	**0.85**
MPV-04-204	2	**0.85**	**2.35**
MPV-04-204	3	**2.35**	**3.85**
MPV-04-204	4	3.85	5.60
	5		
MPV-04-204	6	**5.05**	**7.00**
MPV-04-204	7	**7.00**	**9.80**
MPV-04-204	8	**9.80**	**11.50**
	9	**11.50**	
	10		
	11		
	12		
	13		
	14		
	15		
	16		
	17		
	18		
	19		
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	21		
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	24		
	25		
	26		
	27		
	28		
	29		
	30		

GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	*DESCRIPTION*	*Mpa*
R0	**EXTREMELY WEAK ROCK**	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	**VERY WEAK ROCK**	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	**WEAK ROCK**	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	**MEDIUM STRONG ROCK**	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	**STRONG ROCK**	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	**VERY STRONG ROCK**	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	**EXTREMELY STRONG ROCK**	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY	
CODE	*DESCRIPTION*
0	NONE
1	MINOR
2	MODERATE
3	HEAVY

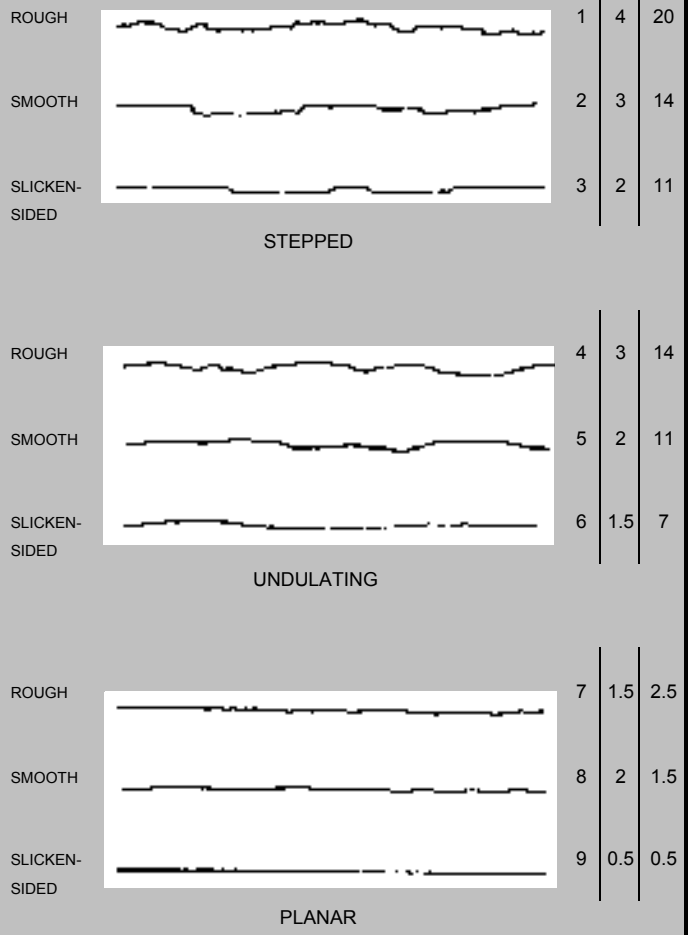
DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	*CATEGORY*
0	STRONG (NEVER BREAKS)
1	MODERATE (SOMETIMES BREAKS)
3	WEAK (ALWAYS BREAKS)

JOINT CONDITION - SMALL SCALE		
CODE	*CATEGORY*	*SUBCATEGORY*
1	STEPPED	ROUGH
2		SMOOTH
3		SLICKENSIDED
4	UNDULATING	ROUGH
5		SMOOTH
6		SLICKENSIDED
7	PLANAR	ROUGH
8		SMOOTH
9		SLICKENSIDED

JOINT FILLING		
CODE	*CATEGORY*	*SUBCATEGORY*
1	NON	COARSE
2	SOFTENING	MEDIUM
3		FINE
4	SOFT	COARSE
5	SHEARED	MEDIUM
6		FINE
7	GOUGE THIKNESS < IRREGULARITIES	
8	GOUGE THIKNESS > IRREGULARITIES	
9	NO INFILL	

JOINT ALTERATION	
CODE	*DESCRIPTION*
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE



	Laubscher	Jr	JRC
ROUGH	1	4	20
SMOOTH	2	3	14
SLICKEN-SIDED	3	2	11
ROUGH	4	3	14
SMOOTH	5	2	11
SLICKEN-SIDED	6	1.5	7
ROUGH	7	1.5	2.5
SMOOTH	8	2	1.5
SLICKEN-SIDED	9	0.5	0.5

SRK STEFFEN, ROBERTSON AND KIRSTEN
Consulting Engineers

MPV_04_204C

MPV_04_204C

MPV_04_204C

amec

FIELD DRILL PERFORMANCE LOG

PROJECT:	Gahcho Kue Geotech
PROJECT NO:	VM00351.H7

HOLE NO:	**MPV-04-205C**
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	05/01/2004 7:00
DATE AND TIME FINISHED:	05/02/2004 7:00
HOLE DIAMETER (mm):	148.0 / 96.1 (SQ / HQ)
CORE DIAMETER (mm):	101.6 / 63.5 (SQ / HQ)

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
DS 0700-1900	K Barnes	05/01/2004	19:00	12.0	6.0	2.60	Mob to MPV-04-205	2.60	6	0.43	12	6	6	0.00
NS 1900-0700	K Barnes	05/02/2004	07:00	12.0	6.0	7.07	Stuck in hole	4.47	6	0.75	24	12	12	0.59
DS 0700-1900	K Barnes	05/02/2004	19:00	12.0	9.0	9.57	Stuck in hole / Demob from MPV-04-205	2.5	3	0.83	36	21	15	0.64

OVERALL HOLE DRILL RATE (m/hr)	0.27
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	0.64

GENERAL GEOTECHNICAL LOG

DRILLHOLE ID: **MPV-04-205C**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	IRS			COMMENT
										STRONG R	WEAK R	% WEAK	
0.00	0.60	0.60	Air										
0.60	2.35	1.75	OB										
2.35	2.60	0.25	OB										
2.60	3.40	0.80	OB										
3.40	3.62	0.22	Gneiss										
3.62	4.57	0.95	Gneiss	0.95	100.0								
4.57	6.07	1.50	Gneiss	1.46	97.3	1.28	85.3	1.28	85.3	5	4	0	Disseminated sulfides
6.07	7.57	1.50	Gneiss	1.47	98.0	0.97	64.7	0.88	58.7	5	4	0	Disseminated sulfides
7.57	9.30	1.73	Gneiss	1.73	100.0	1.54	89.0	1.45	83.8	5	4	0	Disseminated sulfides
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AMEC Photo Log Sheet

Drillhole ID: **MPV-04-205C**

Shift	Camera Photo Number	Filename	Depth (m)	Description
DS 0700-1900	DSCN1786	MPV-04-205C_00.60_Dry_2	0.60 - 2.60	
DS 0700-1900	DSCN2673	MPV-04-205C_02.60_Dry_3	2.60 - 3.85	
DS 0700-1900	DSCN2675	MPV-04-205C_03.85_Dry_4	3.85 - 4.57	
NS 1900-0700	DSCN1785	MPV-04-205C_04.57_Dry_5	4.57 - 7.57	
DS 0700-1900	DSCN1786	MPV-04-205C_07.57_Dry_6	7.57 - 9.30	

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-205C	1	0.00	2.35
MPV-04-205C	2	2.35	2.60
MPV-04-205C	3	2.60	3.85
MPV-04-205C	4	3.85	4.57
MPV-04-205C	5	4.57	7.57
MPV-04-205C	6	7.57	9.30
	7	9.30	
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GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	*DESCRIPTION*	*Mpa*
R0	**EXTREMELY WEAK ROCK**	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	**VERY WEAK ROCK**	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	**WEAK ROCK**	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	**MEDIUM STRONG ROCK**	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	**STRONG ROCK**	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	**VERY STRONG ROCK**	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	**EXTREMELY STRONG ROCK**	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY	
CODE	*DESCRIPTION*
0	NONE
1	MINOR
2	MODERATE
3	HEAVY

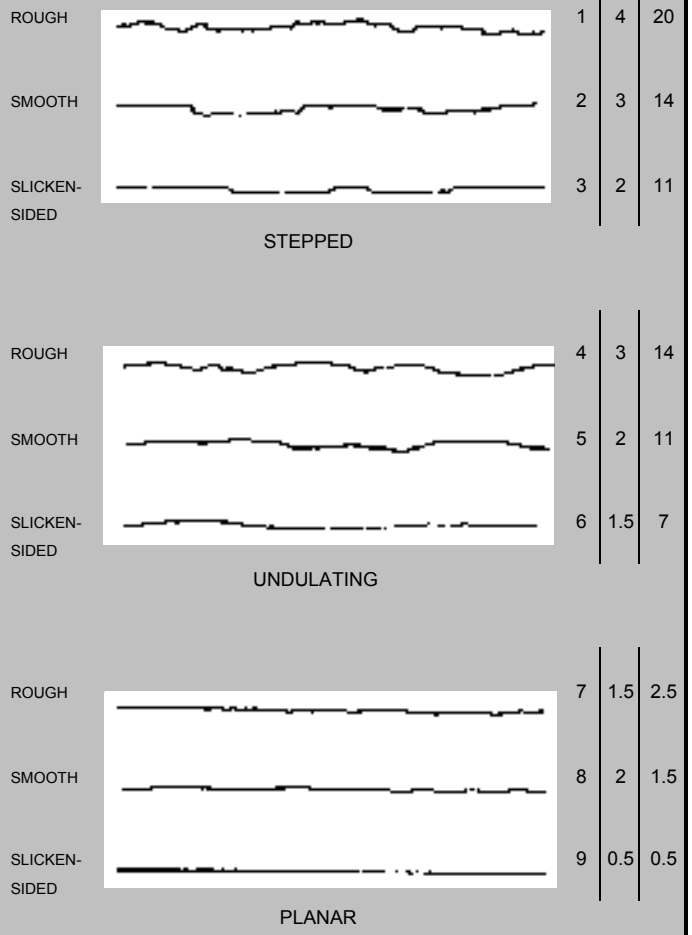
DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	*CATEGORY*
0	STRONG (NEVER BREAKS)
1	MODERATE (SOMETIMES BREAKS)
3	WEAK (ALWAYS BREAKS)

JOINT CONDITION - SMALL SCALE		
CODE	*CATEGORY*	*SUBCATEGORY*
1	STEPPED	ROUGH
2		SMOOTH
3		SLICKENSIDED
4	UNDULATING	ROUGH
5		SMOOTH
6		SLICKENSIDED
7	PLANAR	ROUGH
8		SMOOTH
9		SLICKENSIDED

JOINT FILLING		
CODE	*CATEGORY*	*SUBCATEGORY*
1	NON	COARSE
2	SOFTENING	MEDIUM
3		FINE
4	SOFT	COARSE
5	SHEARED	MEDIUM
6		FINE
7	GOUGE THIKNESS < IRREGULARITIES	
8	GOUGE THIKNESS > IRREGULARITIES	
9	NO INFILL	

JOINT ALTERATION	
CODE	*DESCRIPTION*
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE



	Laubscher	Jr	JRC
ROUGH	1	4	20
SMOOTH	2	3	14
SLICKEN-SIDED	3	2	11
ROUGH	4	3	14
SMOOTH	5	2	11
SLICKEN-SIDED	6	1.5	7
ROUGH	7	1.5	2.5
SMOOTH	8	2	1.5
SLICKEN-SIDED	9	0.5	0.5

SRK STEFFEN, ROBERTSON AND KIRSTEN
Consulting Engineers

MPV_04_205C

MPV_04_205C

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FIELD DRILL PERFORMANCE LOG

PROJECT:	Gahcho Kue Geotech
PROJECT NO:	VM00351.H7

HOLE NO:	**MPV-04-206C**
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	05/01/2004 7:00
DATE AND TIME FINISHED:	05/02/2004 7:00
HOLE DIAMETER (mm):	148.0 / 96.1 (SQ / HQ)
CORE DIAMETER (mm):	101.6 / 63.5 (SQ / HQ)

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
NS 1900-0700	K Barnes	05/03/2004	07:00	12.0	9.0	2.60	Mob to MPV-04-206	2.60	3	0.87	12	9	3	0.00
DS 0700-1900	K Barnes	05/03/2004	19:00	12.0	6.0	7.07	Stuck in hole	4.47	6	0.75	24	15	9	0.79

OVERALL HOLE DRILL RATE (m/hr)	0.29
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	0.79

GENERAL GEOTECHNICAL LOG

DRILLHOLE ID: MPV-04-206C

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	IRS STRONG R	IRS WEAK R	IRS % WEAK	COMMENT
0.00	0.50	0.50	Air										
0.50	1.70	1.20	OB										
2.90	4.40	1.50	OB										
4.40	5.40	1.00	OB	0.50	50.0								
5.40	6.50	1.10	OB	0.45	40.9								
6.50	7.00	0.50	Gneiss	0.50	100.0								
7.00	8.50	1.50	Gneiss	1.50	100.0	1.50	100.0	1.35	90.0	5	4	0	
8.50	10.00	1.50	Gneiss	1.50	100.0	1.35	90.0	1.26	84.0	5	4	0	
10.00	11.50	1.50	Gneiss	1.45	96.7	1.31	87.3	1.31	87.3	5	4	0	
11.50	13.07	1.57	Gneiss	1.57	100.0	1.55	98.7	1.55	98.7	5	4	0	
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AMEC Photo Log Sheet

Drillhole ID: **MPV-04-206C**

Shift	Camera Photo Number	Filename	Depth (m)	Description
DS 0700-1900	DSCN2647	MPV-04-206C_01.70_Dry_1	1.70 - 2.90	
DS 0700-1900	DSCN2651	MPV-04-206C_02.90_Dry_2	2.90 - 4.40	
DS 0700-1900	DSCN2652	MPV-04-206C_04.40_Dry_3	4.40 - 5.40	
DS 0700-1900	DSCN2653	MPV-04-206C_05.40_Dry_4	5.40 - 7.00	
DS 0700-1900	DSCN1845	MPV-04-206C_07.00_Dry_6	7.00 - 9.70	
DS 0700-1900	DSCN1846	MPV-04-206C_09.70_Dry_7	9.70 - 12.50	
DS 0700-1900	DSCN1847	MPV-04-206C_12.50_Dry_8	12.50 - 13.07	

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-206C	1	1.70	2.90
MPV-04-206C	2	2.90	4.40
MPV-04-206C	3	4.40	5.40
MPV-04-206C	4	5.40	7.00
MPV-04-206C	5	7.00	9.70
MPV-04-206C	6	9.70	12.50
MPV-04-206C	7	12.50	13.07
	8	13.07	
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GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	*DESCRIPTION*	*Mpa*
R0	**EXTREMELY WEAK ROCK**	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	**VERY WEAK ROCK**	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	**WEAK ROCK**	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	**MEDIUM STRONG ROCK**	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	**STRONG ROCK**	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	**VERY STRONG ROCK**	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	**EXTREMELY STRONG ROCK**	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY	
CODE	*DESCRIPTION*
0	NONE
1	MINOR
2	MODERATE
3	HEAVY

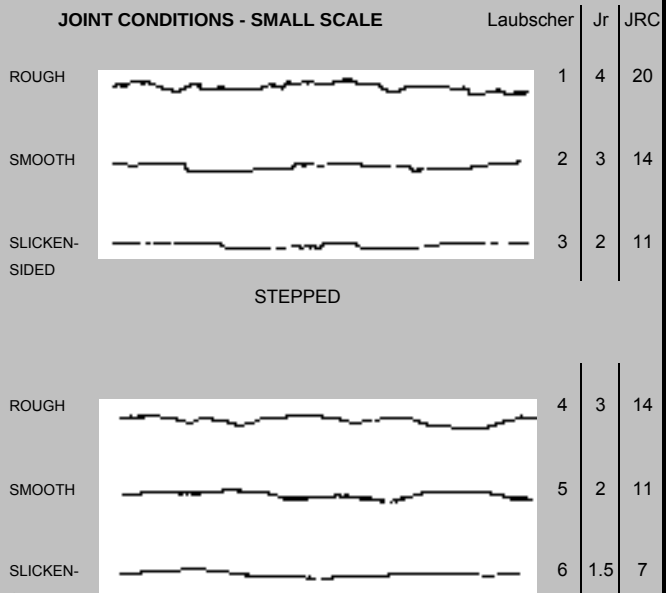
DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	*CATEGORY*
0	STRONG (NEVER BREAKS)
1	MODERATE (SOMETIMES BREAKS)
3	WEAK (ALWAYS BREAKS)

JOINT CONDITION - SMALL SCALE		
CODE	*CATEGORY*	*SUBCATEGORY*
1	STEPPED	ROUGH
2		SMOOTH
3		SLICKENSIDED
4	UNDULATING	ROUGH
5		SMOOTH
6		SLICKENSIDED
7	PLANAR	ROUGH
8		SMOOTH
9		SLICKENSIDED

JOINT FILLING		
CODE	*CATEGORY*	*SUBCATEGORY*
1	NON	COARSE
2	SOFTENING	MEDIUM
3		FINE
4	SOFT	COARSE
5	SHEARED	MEDIUM
6		FINE
7	GOUGE THIKNESS < IRREGULARITIES	
8	GOUGE THIKNESS > IRREGULARITIES	
9	NO INFILL	

JOINT ALTERATION	
CODE	*DESCRIPTION*
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE



STEFFEN, ROBERTSON AND KIRSTEN
Consulting Engineers

MPV_04_206C

MPV_04_206C

MPV_04_206C

FIELD DRILL PERFORMANCE LOG

PROJECT:	Gahcho Kue Geotech
PROJECT NO:	VM00351.H7

HOLE NO:	**MPV-04-207C**
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	05/03/2004 19:00
DATE AND TIME FINISHED:	05/04/2004 0:00
HOLE DIAMETER (mm):	148.0 / 96.1 (SQ / HQ)
CORE DIAMETER (mm):	101.6 / 63.5 (SQ / HQ)

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
NS 1900-0700	L Sampson	05/04/2004	07:00	12.0	8.0	4.10	Mob to MPV-04-207	4.10	4	1.03	12	8	4	0.00
DS 0700-1900	K Barnes	05/04/2004	19:00	12.0	6.0	11.57	Demob from MPV-04-207 / Mob to MPV-04-208	7.47	6	1.25	24	14	10	1.16

OVERALL HOLE DRILL RATE (m/hr)	0.48
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	1.16

GENERAL GEOTECHNICAL LOG

DRILLHOLE ID: **MPV-04-207C**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM	TO	RUN	ROCK	TCR	TCR	SCR	SCR	RQD	RQD	IRS			COMMENT
(m)	(m)	(m)	TYPE	(m)	(%)	(m)	(%)	(m)	(%)	STRONG R	WEAK R	% WEAK	
0.00	0.55	0.55	Air										
0.55	2.05	1.50	OB	1.05	70.0								
2.05	2.68	0.63	OB	0.00	0.0								
2.68	4.15	1.47	OB	1.47	100.0								
4.15	5.10	0.95	OB	0.66	69.5								
5.10	5.50	0.40	Gneiss	0.40	100.0								
5.50	7.00	1.50	Gneiss	1.50	100.0	1.38	92.0	1.30	86.7	5	4	0	
7.00	8.50	1.50	Gneiss	1.40	93.3	1.15	76.7	1.15	76.7	5	4	0	
8.50	10.00	1.50	Gneiss	1.50	100.0	1.00	66.7	1.00	66.7	5	4	0	
10.00	11.59	1.59	Gneiss	1.59	100.0	1.33	83.6	1.33	83.6	5	4	0	
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AMEC Photo Log Sheet

Drillhole ID: **MPV-04-207C**

Shift	Camera Photo Number	Filename	Depth (m)	Description
DS 0700-1900	DSCN2676	MPV-04-207_00.55_1	0.55 - 2.05	
DS 0700-1900	DSCN1786	MPV-04-207_02.68_2	2.68 - 3.63	
DS 0700-1900	DSCN1787	MPV-04-207_03.15_2b	3.15 - 4.15	
DS 0700-1900	DSCN2682	MPV-04-207_04.15_3	4.15 - 5.50	
DS 0700-1900	DSCN1785	MPV-04-207_05.50_4	5.50 - 8.23	
DS 0700-1900	DSCN1786	MPV-04-207_08.23_5	8.23 - 10.83	
DS 0700-1900	DSCN1787	MPV-04-207_10.83_6	10.83 - 11.59	

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-207C	1	0.00	2.05
MPV-04-207C		2.05	2.68
MPV-04-207C	2	2.68	4.15
MPV-04-207C	3	4.15	5.50
MPV-04-207C	4	5.50	8.23
MPV-04-207C	5	8.23	10.83
MPV-04-207C	6	10.83	11.59
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GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	*DESCRIPTION*	*Mpa*
R0	**EXTREMELY WEAK ROCK**	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	**VERY WEAK ROCK**	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	**WEAK ROCK**	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	**MEDIUM STRONG ROCK**	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	**STRONG ROCK**	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	**VERY STRONG ROCK**	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	**EXTREMELY STRONG ROCK**	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY	
CODE	*DESCRIPTION*
0	NONE
1	MINOR
2	MODERATE
3	HEAVY

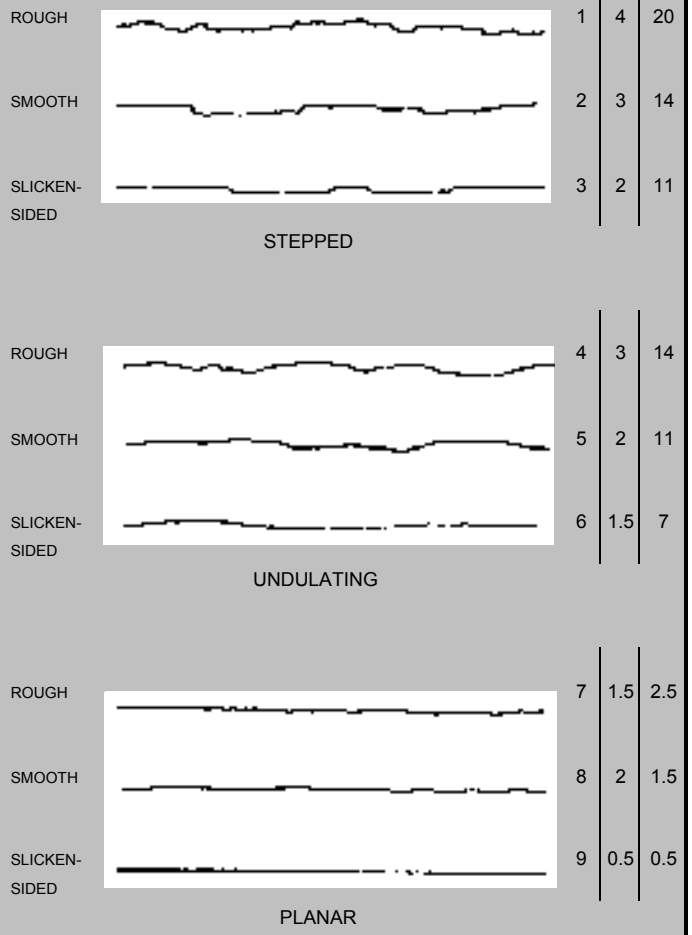
DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	*CATEGORY*
0	STRONG (NEVER BREAKS)
1	MODERATE (SOMETIMES BREAKS)
3	WEAK (ALWAYS BREAKS)

JOINT CONDITION - SMALL SCALE		
CODE	*CATEGORY*	*SUBCATEGORY*
1	STEPPED	ROUGH
2		SMOOTH
3		SLICKENSIDED
4	UNDULATING	ROUGH
5		SMOOTH
6		SLICKENSIDED
7	PLANAR	ROUGH
8		SMOOTH
9		SLICKENSIDED

JOINT FILLING		
CODE	*CATEGORY*	*SUBCATEGORY*
1	NON	COARSE
2	SOFTENING	MEDIUM
3		FINE
4	SOFT	COARSE
5	SHEARED	MEDIUM
6		FINE
7	GOUGE THIKNESS < IRREGULARITIES	
8	GOUGE THIKNESS > IRREGULARITIES	
9	NO INFILL	

JOINT ALTERATION	
CODE	*DESCRIPTION*
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE



	Laubscher	Jr	JRC
ROUGH	1	4	20
SMOOTH	2	3	14
SLICKEN-SIDED	3	2	11
ROUGH	4	3	14
SMOOTH	5	2	11
SLICKEN-SIDED	6	1.5	7
ROUGH	7	1.5	2.5
SMOOTH	8	2	1.5
SLICKEN-SIDED	9	0.5	0.5

SRK STEFFEN, ROBERTSON AND KIRSTEN
Consulting Engineers

MPV_04_207C

MPV_04_207C

MPV_04_207C

FIELD DRILL PERFORMANCE LOG

PROJECT:	Gahcho Kue Geotech
PROJECT NO:	VM00351.H7

HOLE NO:	**MPV-04-208C**
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	05/04/2004 19:00
DATE AND TIME FINISHED:	05/05/2004 0:00
HOLE DIAMETER (mm):	96.1 (HQ)
CORE DIAMETER (mm):	63.5 (HQ)

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
NS 1900-0700	L Sampson	05/05/2004	07:00	12.0	5.0	7.50	DeMob from MPV-04-208 / Mob to MPV-04-209C	7.50	7	1.07	12	5	7	0.00

OVERALL HOLE DRILL RATE (m/hr)	0.63
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	1.07

amec

GENERAL GEOTECHNICAL LOG

DRILLHOLE ID: **MPV-04-208C**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	IRS			COMMENT
										STRONG R	WEAK R	% WEAK	
0.00	0.46	0.46	Air										
0.46	2.54	2.08	OB										
2.54	3.00	0.46	Gneiss	0.46	100.0	0.11	23.9	0.00	0.0	5			
3.00	4.50	1.50	Gneiss	1.50	100.0	0.37	24.7	0.37	24.7	5			
4.50	6.00	1.50	Gneiss	1.50	100.0	0.54	36.0	0.47	31.3	5			
6.00	7.50	1.50	Gneiss	1.50	100.0	1.06	70.7	0.99	66.0	5			
		0.00											
		0.00											
		0.00											
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		0.00											

AMEC Photo Log Sheet

Drillhole ID: **MPV-04-208C**

Shift	Camera Photo Number	Filename	Depth (m)	Description
NS 1900-0700	DSCN1871	MPV-04-208_2.54_Dry_1	2.54 - 4.33	
NS 1900-0700	DSCN1868	MPV-04-208_4.33_Dry_2	4.33 - 7.13	
NS 1900-0700	DSCN1866	MPV-04-208_7.50_Dry_3	7.13 - 7.50	

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-208C	1	2.54	4.33
MPV-04-208C	2	4.33	7.13
MPV-04-208C	3	7.13	7.50
	4	7.50	
	5		
	6		
	7		
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GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	*DESCRIPTION*	*Mpa*
R0	**EXTREMELY WEAK ROCK**	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	**VERY WEAK ROCK**	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	**WEAK ROCK**	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	**MEDIUM STRONG ROCK**	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	**STRONG ROCK**	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	**VERY STRONG ROCK**	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	**EXTREMELY STRONG ROCK**	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY	
CODE	*DESCRIPTION*
0	NONE
1	MINOR
2	MODERATE
3	HEAVY

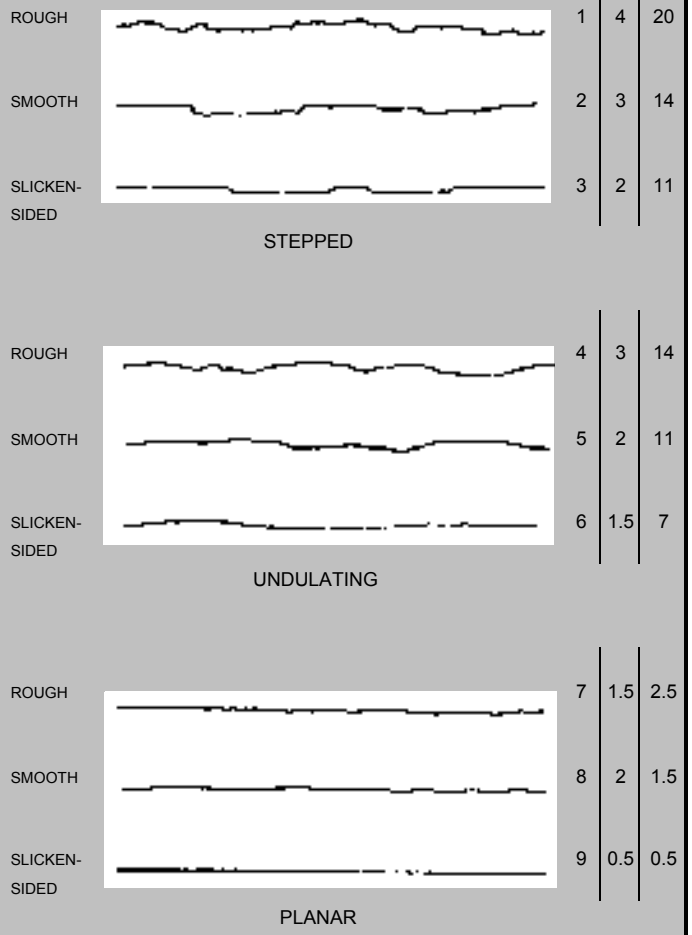
DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	*CATEGORY*
0	STRONG (NEVER BREAKS)
1	MODERATE (SOMETIMES BREAKS)
3	WEAK (ALWAYS BREAKS)

JOINT CONDITION - SMALL SCALE		
CODE	*CATEGORY*	*SUBCATEGORY*
1	STEPPED	ROUGH
2		SMOOTH
3		SLICKENSIDED
4	UNDULATING	ROUGH
5		SMOOTH
6		SLICKENSIDED
7	PLANAR	ROUGH
8		SMOOTH
9		SLICKENSIDED

JOINT FILLING		
CODE	*CATEGORY*	*SUBCATEGORY*
1	NON	COARSE
2	SOFTENING	MEDIUM
3		FINE
4	SOFT	COARSE
5	SHEARED	MEDIUM
6		FINE
7	GOUGE THIKNESS < IRREGULARITIES	
8	GOUGE THIKNESS > IRREGULARITIES	
9	NO INFILL	

JOINT ALTERATION	
CODE	*DESCRIPTION*
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE



	Laubscher	Jr	JRC
ROUGH	1	4	20
SMOOTH	2	3	14
SLICKEN-SIDED	3	2	11
ROUGH	4	3	14
SMOOTH	5	2	11
SLICKEN-SIDED	6	1.5	7
ROUGH	7	1.5	2.5
SMOOTH	8	2	1.5
SLICKEN-SIDED	9	0.5	0.5

SRK STEFFEN, ROBERTSON AND KIRSTEN
Consulting Engineers

MPV_04_208C

FIELD DRILL PERFORMANCE LOG

PROJECT:	Gahcho Kue Geotech
PROJECT NO:	VM00351.H7

HOLE NO:	**MPV-04-209C**
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	05/05/2004 7:00
DATE AND TIME FINISHED:	05/06/2004 7:00
HOLE DIAMETER (mm):	96.1 (HQ)
CORE DIAMETER (mm):	63.5 (HQ)

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
DS 0700-1900	K Barnes	05/05/2004	19:00	12.0	6.0	7.50	Mob/demob to MPV-04-209C/Mob to MPV-04-210C	7.50	6	1.25	12	6	6	0.00

OVERALL HOLE DRILL RATE (m/hr)	0.63
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	1.25

GENERAL GEOTECHNICAL LOG

DRILLHOLE ID: **MPV-04-209C**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	IRS			COMMENT
										STRONG R	WEAK R	% WEAK	
0.00	0.50	0.50	Air										
0.50	2.10	1.60	OB										
2.10	3.60	1.50	Gneiss	1.50	100.0	1.41	94.0	1.34	0.0	5			
3.60	5.10	1.50	Gneiss	1.41	94.0	1.41	94.0	1.19	79.3	5			
5.10	6.60	1.50	Gneiss	1.43	95.3	1.40	93.3	1.35	90.0	5			
6.60	8.41	1.81	Gneiss	1.81	100.0	1.74	96.1	1.52	84.0	5			
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AMEC Photo Log Sheet

Drillhole ID: **MPV-04-209C**

Shift	Camera Photo Number	Filename	Depth (m)	Description
DS 0700-1900	DSCN1873.JPG	MPV-04-209_2.10_Dry_1.JPG	2.10 - 4.88	
DS 0700-1900	DSCN1876.JPG	MPV-04-209_4.88_Dry_2.JPG	4.88 - 7.80	
DS 0700-1900	DSCN1878.JPG	MPV-04-209_7.80_Dry_3.JPG	7.80 - 8.41	

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-209C	1	2.51	4.88
MPV-04-209C	2	4.88	7.80
MPV-04-209C	3	7.80	8.41
	4	8.41	
	5		
	6		
	7		
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GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	*DESCRIPTION*	*Mpa*
R0	**EXTREMELY WEAK ROCK**	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	**VERY WEAK ROCK**	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	**WEAK ROCK**	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	**MEDIUM STRONG ROCK**	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	**STRONG ROCK**	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	**VERY STRONG ROCK**	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	**EXTREMELY STRONG ROCK**	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY	
CODE	*DESCRIPTION*
0	NONE
1	MINOR
2	MODERATE
3	HEAVY

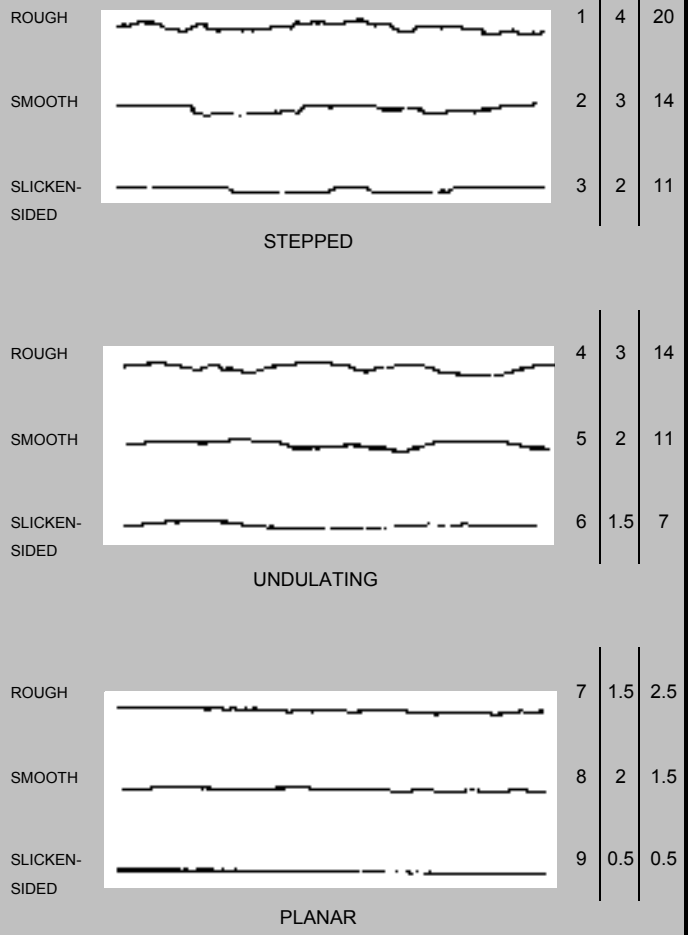
DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	*CATEGORY*
0	STRONG (NEVER BREAKS)
1	MODERATE (SOMETIMES BREAKS)
3	WEAK (ALWAYS BREAKS)

JOINT CONDITION - SMALL SCALE		
CODE	*CATEGORY*	*SUBCATEGORY*
1	STEPPED	ROUGH
2		SMOOTH
3		SLICKENSIDED
4	UNDULATING	ROUGH
5		SMOOTH
6		SLICKENSIDED
7	PLANAR	ROUGH
8		SMOOTH
9		SLICKENSIDED

JOINT FILLING		
CODE	*CATEGORY*	*SUBCATEGORY*
1	NON	COARSE
2	SOFTENING	MEDIUM
3		FINE
4	SOFT	COARSE
5	SHEARED	MEDIUM
6		FINE
7	GOUGE THIKNESS < IRREGULARITIES	
8	GOUGE THIKNESS > IRREGULARITIES	
9	NO INFILL	

JOINT ALTERATION	
CODE	*DESCRIPTION*
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE



	Laubscher	Jr	JRC
ROUGH	1	4	20
SMOOTH	2	3	14
SLICKEN-SIDED	3	2	11
ROUGH	4	3	14
SMOOTH	5	2	11
SLICKEN-SIDED	6	1.5	7
ROUGH	7	1.5	2.5
SMOOTH	8	2	1.5
SLICKEN-SIDED	9	0.5	0.5

SRK STEFFEN, ROBERTSON AND KIRSTEN
Consulting Engineers

MPV_04_209C

FIELD DRILL PERFORMANCE LOG

PROJECT:	Gahcho Kue Geotech
PROJECT NO:	VM00351.H7

HOLE NO:	**MPV-04-210C**
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	05/05/2004 19:00
DATE AND TIME FINISHED:	05/06/2004 7:00
HOLE DIAMETER (mm):	96.1 (HQ)
CORE DIAMETER (mm):	63.5 (HQ)

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
NS 1900-0700	L Sampson	05/06/2004	07:00	12.0	6.0	7.50	Demob from MPV-04-210C/Mob to MPV-04-211C	7.50	6	1.25	12	6	6	0.00

OVERALL HOLE DRILL RATE (m/hr)	0.63
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	1.25

GENERAL GEOTECHNICAL LOG

DRILLHOLE ID: **MPV-04-210C**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	IRS STRONG R	IRS WEAK R	IRS % WEAK	COMMENT
0.00	0.46	0.46	Air										
0.46	1.78	1.32	OB										
1.78	3.00	1.22	Gneiss	1.02	83.6	0.24	19.7	0.10	8.2	5	4	0	
3.00	4.50	1.50	Gneiss	1.44	96.0	1.01	67.3	1.01	67.3	5	4	0	
4.50	6.00	1.50	Gneiss	1.50	100.0	1.15	76.7	0.93	62.0	5	4	0	
6.00	7.50	1.50	Gneiss	1.50	100.0	1.32	88.0	1.24	82.7	5	4	0	
		0.00											
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AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-210C	1	1.78	4.88
MPV-04-210C	2	4.88	7.50
	3	7.50	
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GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	*DESCRIPTION*	*Mpa*
R0	**EXTREMELY WEAK ROCK**	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	**VERY WEAK ROCK**	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	**WEAK ROCK**	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	**MEDIUM STRONG ROCK**	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	**STRONG ROCK**	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	**VERY STRONG ROCK**	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	**EXTREMELY STRONG ROCK**	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY	
CODE	*DESCRIPTION*
0	NONE
1	MINOR
2	MODERATE
3	HEAVY

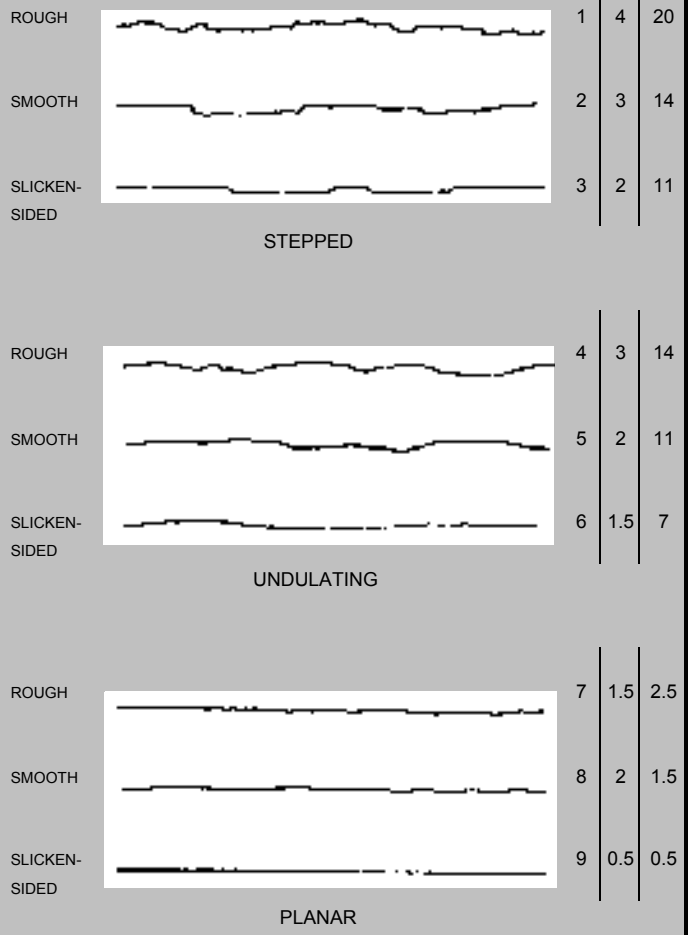
DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	*CATEGORY*
0	STRONG (NEVER BREAKS)
1	MODERATE (SOMETIMES BREAKS)
3	WEAK (ALWAYS BREAKS)

JOINT CONDITION - SMALL SCALE		
CODE	*CATEGORY*	*SUBCATEGORY*
1	STEPPED	ROUGH
2		SMOOTH
3		SLICKENSIDED
4	UNDULATING	ROUGH
5		SMOOTH
6		SLICKENSIDED
7	PLANAR	ROUGH
8		SMOOTH
9		SLICKENSIDED

JOINT FILLING		
CODE	*CATEGORY*	*SUBCATEGORY*
1	NON	COARSE
2	SOFTENING	MEDIUM
3		FINE
4	SOFT	COARSE
5	SHEARED	MEDIUM
6		FINE
7	GOUGE THIKNESS < IRREGULARITIES	
8	GOUGE THIKNESS > IRREGULARITIES	
9	NO INFILL	

JOINT ALTERATION	
CODE	*DESCRIPTION*
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE



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ROUGH	4	3	14
SMOOTH	5	2	11
SLICKEN-SIDED	6	1.5	7
ROUGH	7	1.5	2.5
SMOOTH	8	2	1.5
SLICKEN-SIDED	9	0.5	0.5

SRK STEFFEN, ROBERTSON AND KIRSTEN
Consulting Engineers

MPV_04_210C

amec

FIELD DRILL PERFORMANCE LOG

PROJECT:	Gahcho Kue Geotech
PROJECT NO:	VM00351.H7

HOLE NO:	**MPV-04-211C**
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	05/06/2004 7:00
DATE AND TIME FINISHED:	05/06/2004 19:00
HOLE DIAMETER (mm):	96.1 (HQ)
CORE DIAMETER (mm):	63.5 (HQ)

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
DS 0700-1900	K Barnes	05/06/2004	19:00	12.0	6.0	7.50	Mob / demob to MPV-04-211C	7.5	6	1.25	12	6	6	1.25

OVERALL HOLE DRILL RATE (m/hr)	0.63
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	1.25

amec

GENERAL GEOTECHNICAL LOG

DRILLHOLE ID: **MPV-04-211C**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
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FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	IRS			COMMENT
										STRONG R	WEAK R	% WEAK	
0.00	0.50	0.50	Air										
0.50	1.50	1.00	OB										
1.50	3.00	1.50	Gneiss	1.44	96.0	1.05	70.0	0.91	60.7	R5	R4	0	
3.00	4.50	1.50	Gneiss	1.46	97.3	1.06	70.7	0.99	66.0	R5	R4	0	
4.50	6.00	1.50	Gneiss	1.48	98.7	1.42	94.7	1.25	83.3	R5	R4	0	
6.00	7.10	1.10	Gneiss	1.10	100.0	1.10	100.0	1.10	100.0	R5	R4	0	
		0.00											
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AMEC Photo Log Sheet

Drillhole ID: **MPV-04-211C**

Shift	Camera Photo Number	Filename	Depth (m)	Description
NS 1900-0700	dscn1896.JPG	MPV-04-211_1.50_Dry_1.JPG	1.78 - 4.88	
NS 1900-0700	DSCN1894.JPG	MPV-04-210_4.20_Dry_2.JPG	4.88 - 7.50	

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-211C	1	1.78	4.88
MPV-04-211C	2	4.88	7.50
	3	7.50	
	4		
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	30		

GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	*DESCRIPTION*	*Mpa*
R0	**EXTREMELY WEAK ROCK**	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	**VERY WEAK ROCK**	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	**WEAK ROCK**	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	**MEDIUM STRONG ROCK**	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	**STRONG ROCK**	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	**VERY STRONG ROCK**	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	**EXTREMELY STRONG ROCK**	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY	
CODE	*DESCRIPTION*
0	NONE
1	MINOR
2	MODERATE
3	HEAVY

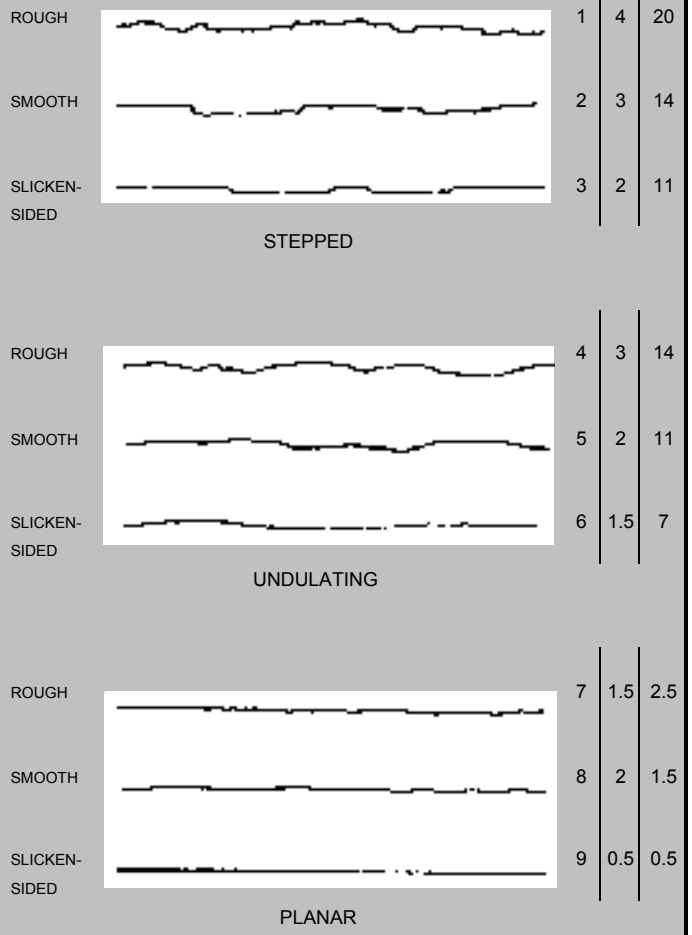
DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	*CATEGORY*
0	STRONG (NEVER BREAKS)
1	MODERATE (SOMETIMES BREAKS)
3	WEAK (ALWAYS BREAKS)

JOINT CONDITION - SMALL SCALE		
CODE	*CATEGORY*	*SUBCATEGORY*
1	STEPPED	ROUGH
2		SMOOTH
3		SLICKENSIDED
4	UNDULATING	ROUGH
5		SMOOTH
6		SLICKENSIDED
7	PLANAR	ROUGH
8		SMOOTH
9		SLICKENSIDED

JOINT FILLING		
CODE	*CATEGORY*	*SUBCATEGORY*
1	NON	COARSE
2	SOFTENING	MEDIUM
3		FINE
4	SOFT	COARSE
5	SHEARED	MEDIUM
6		FINE
7	GOUGE THIKNESS < IRREGULARITIES	
8	GOUGE THIKNESS > IRREGULARITIES	
9	NO INFILL	

JOINT ALTERATION	
CODE	*DESCRIPTION*
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE



	Laubscher	Jr	JRC
ROUGH	1	4	20
SMOOTH	2	3	14
SLICKEN-SIDED	3	2	11
ROUGH	4	3	14
SMOOTH	5	2	11
SLICKEN-SIDED	6	1.5	7
ROUGH	7	1.5	2.5
SMOOTH	8	2	1.5
SLICKEN-SIDED	9	0.5	0.5

SRK STEFFEN, ROBERTSON AND KIRSTEN
Consulting Engineers

MPV_04_211C

amec

FIELD DRILL PERFORMANCE LOG

PROJECT:	Gahcho Kue Geotech
PROJECT NO:	VM00351.H7

HOLE NO:	**MPV-04-212C**
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	05/06/2004 7:00
DATE AND TIME FINISHED:	05/07/2004 7:00
HOLE DIAMETER (mm):	96.1 (HQ)
CORE DIAMETER (mm):	63.5 (HQ)

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
NS 1900-0700	L Sampson	05/07/2004	0700	12.0	6.0	9.00	Mob / Demob to/from MPV-04-212C	9	6	1.50	12	6	6	1.50

OVERALL HOLE DRILL RATE (m/hr)	0.75
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	1.50

GENERAL GEOTECHNICAL LOG

DRILLHOLE ID: **MPV-04-212C**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM	TO	RUN	ROCK	TCR	TCR	SCR	SCR	RQD	RQD	IRS			COMMENT
(m)	(m)	(m)	TYPE	(m)	(%)	(m)	(%)	(m)	(%)	STRONG R	WEAK R	% WEAK	
0.00	0.92	0.92	Air										
0.92	3.62	2.70	OB										
3.62	4.50	0.88	Gneiss	0.83	94.3	0.71	80.7	0.64	72.7	R5	R4	0	
4.50	6.00	1.50	Gneiss	1.50	100.0	1.56	104.0	1.34	89.3	R5	R4	0	
6.00	7.50	1.50	Gneiss	1.44	96.0	1.16	77.3	1.01	67.3	R5	R4	0	
7.50	9.00	1.50	Gneiss	1.50	100.0	1.12	74.7	0.95	63.3	R5	R4	0	
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AMEC Photo Log Sheet

Drillhole ID: **MPV-04-212C**

Shift	Camera Photo Number	Filename	Depth (m)	Description
NS 1900-0700	DSCN1900.JPG	MPV-04-212_03.62_Dry_1.JPG	3.62 - 6.42	
NS 1900-0700	dscn1901.JPG	MPV-04-212_06.42_Dry_2.JPG	6.42 - 9.00	

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-212C	1	3.62	6.42
MPV-04-212C	2	6.42	9.00
	3	9.00	
	4		
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GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	*DESCRIPTION*	*Mpa*
R0	**EXTREMELY WEAK ROCK**	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	**VERY WEAK ROCK**	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	**WEAK ROCK**	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	**MEDIUM STRONG ROCK**	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	**STRONG ROCK**	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	**VERY STRONG ROCK**	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	**EXTREMELY STRONG ROCK**	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY	
CODE	*DESCRIPTION*
0	NONE
1	MINOR
2	MODERATE
3	HEAVY

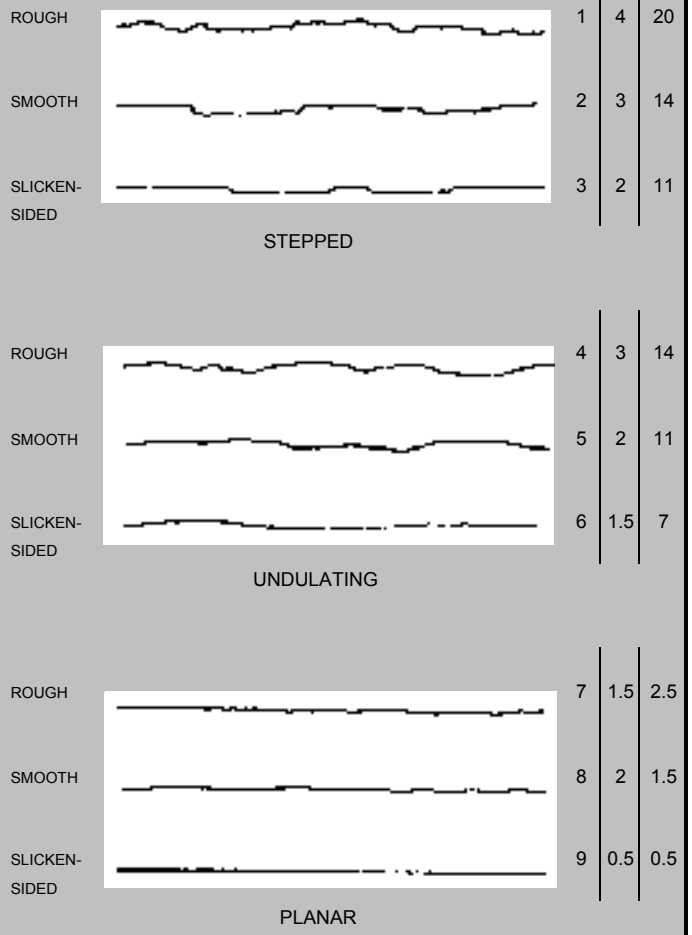
DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	*CATEGORY*
0	STRONG (NEVER BREAKS)
1	MODERATE (SOMETIMES BREAKS)
3	WEAK (ALWAYS BREAKS)

JOINT CONDITION - SMALL SCALE		
CODE	*CATEGORY*	*SUBCATEGORY*
1	STEPPED	ROUGH
2		SMOOTH
3		SLICKENSIDED
4	UNDULATING	ROUGH
5		SMOOTH
6		SLICKENSIDED
7	PLANAR	ROUGH
8		SMOOTH
9		SLICKENSIDED

JOINT FILLING		
CODE	*CATEGORY*	*SUBCATEGORY*
1	NON	COARSE
2	SOFTENING	MEDIUM
3		FINE
4	SOFT	COARSE
5	SHEARED	MEDIUM
6		FINE
7	GOUGE THIKNESS < IRREGULARITIES	
8	GOUGE THIKNESS > IRREGULARITIES	
9	NO INFILL	

JOINT ALTERATION	
CODE	*DESCRIPTION*
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE



	Laubscher	Jr	JRC
ROUGH	1	4	20
SMOOTH	2	3	14
SLICKEN-SIDED	3	2	11
ROUGH	4	3	14
SMOOTH	5	2	11
SLICKEN-SIDED	6	1.5	7
ROUGH	7	1.5	2.5
SMOOTH	8	2	1.5
SLICKEN-SIDED	9	0.5	0.5

SRK STEFFEN, ROBERTSON AND KIRSTEN
Consulting Engineers

MPV_04_212C

amec

FIELD DRILL PERFORMANCE LOG

PROJECT:	Gahcho Kue Geotech
PROJECT NO:	VM00351.H7

HOLE NO:	**MPV-04-213C**
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	05/04/2004 19:00
DATE AND TIME FINISHED:	05/05/2004 0:00
HOLE DIAMETER (mm):	96.1 (HQ)
CORE DIAMETER (mm):	63.5 (HQ)

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
DS 0700-1900	K Barnes	05/07/2004	19:00	12.0	10.0	2.55	Mob to MPV-04-213	2.55	2	1.28	12	10	2	0.00
NS 1900-0700	L Sampson	05/08/2004	07:00	12.0	6.0	7.75	DeMob from MPV-04-213 / Mob to MPV-04-215	5.2	6	0.87	24	16	8	0.97

OVERALL HOLE DRILL RATE (m/hr)	0.32
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	0.97

GENERAL GEOTECHNICAL LOG

DRILLHOLE ID: **MPV-04-213C**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM	TO	RUN	ROCK	TCR	TCR	SCR	SCR	RQD	RQD	IRS			COMMENT
(m)	(m)	(m)	TYPE	(m)	(%)	(m)	(%)	(m)	(%)	STRONG R	WEAK R	% WEAK	
0.00	1.50	1.50	Air										
1.50	2.55	1.05	OB										
2.55	4.05	1.50	Gneiss	1.42	94.7	0.65	43.3	0.58	38.7	5			
4.05	5.55	1.50	Gneiss	1.43	95.3	1.31	87.3	1.15	76.7	5			
5.55	7.05	1.50	Gneiss	1.50	100.0	1.50	100.0	1.50	100.0	5			
7.05	7.75	0.70	Gneiss	0.70	100.0	0.51	72.9	0.51	72.9	5			
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AMEC Photo Log Sheet

Drillhole ID: **MPV-04-213C**

Shift	Camera Photo Number	Filename	Depth (m)	Description
NS 1900-0700	DSCN1902	MPV-04-213_2.55_Dry_1	2.55 - 5.41	
NS 1900-0700	dscn1903	MPV-04-213_5.41_Dry_2	5.41 - 7.75	

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-213C	1	2.55	5.41
MPV-04-213C	2	5.41	7.75
	3	7.75	
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GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	*DESCRIPTION*	*Mpa*
R0	**EXTREMELY WEAK ROCK**	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	**VERY WEAK ROCK**	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	**WEAK ROCK**	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	**MEDIUM STRONG ROCK**	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	**STRONG ROCK**	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	**VERY STRONG ROCK**	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	**EXTREMELY STRONG ROCK**	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY	
CODE	*DESCRIPTION*
0	NONE
1	MINOR
2	MODERATE
3	HEAVY

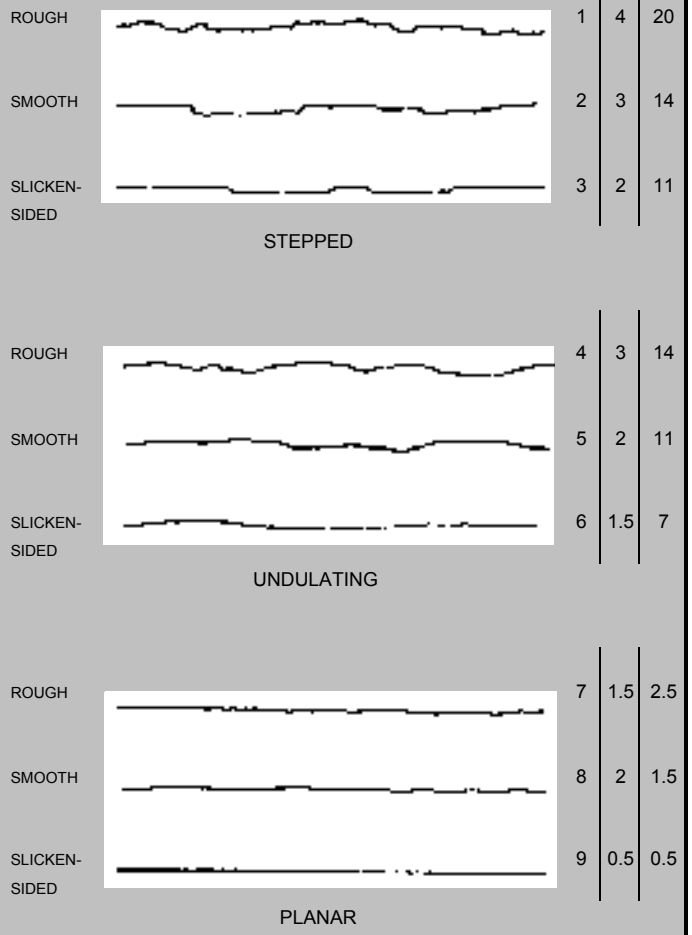
DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	*CATEGORY*
0	STRONG (NEVER BREAKS)
1	MODERATE (SOMETIMES BREAKS)
3	WEAK (ALWAYS BREAKS)

JOINT CONDITION - SMALL SCALE		
CODE	*CATEGORY*	*SUBCATEGORY*
1	STEPPED	ROUGH
2		SMOOTH
3		SLICKENSIDED
4	UNDULATING	ROUGH
5		SMOOTH
6		SLICKENSIDED
7	PLANAR	ROUGH
8		SMOOTH
9		SLICKENSIDED

JOINT FILLING		
CODE	*CATEGORY*	*SUBCATEGORY*
1	NON	COARSE
2	SOFTENING	MEDIUM
3		FINE
4	SOFT	COARSE
5	SHEARED	MEDIUM
6		FINE
7	GOUGE THIKNESS < IRREGULARITIES	
8	GOUGE THIKNESS > IRREGULARITIES	
9	NO INFILL	

JOINT ALTERATION	
CODE	*DESCRIPTION*
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE



	Laubscher	Jr	JRC
ROUGH	1	4	20
SMOOTH	2	3	14
SLICKEN-SIDED	3	2	11
ROUGH	4	3	14
SMOOTH	5	2	11
SLICKEN-SIDED	6	1.5	7
ROUGH	7	1.5	2.5
SMOOTH	8	2	1.5
SLICKEN-SIDED	9	0.5	0.5

SRK STEFFEN, ROBERTSON AND KIRSTEN
Consulting Engineers

MPV_04_213C


MPV-04-213C
Box 1
255-541m
MPV-04-213C
255-541


MPV-04-213C
Box 2
541-775

amec

FIELD DRILL PERFORMANCE LOG

PROJECT:	Gahcho Kue Geotech
PROJECT NO:	VM00351.H7

HOLE NO:	**MPV-04-214C**
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	05/07/2004 19:00
DATE AND TIME FINISHED:	05/08/2004 1:00
HOLE DIAMETER (mm):	96.1 (HQ)
CORE DIAMETER (mm):	63.5 (HQ)

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
NS 1900-0700	L Sampson	05/08/2004	07:00	12.0	6.0	7.45	DeMob from MPV-04-214	7.45	6	1.24	12	6	6	0.00

OVERALL HOLE DRILL RATE (m/hr)	0.62
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	1.24

GENERAL GEOTECHNICAL LOG

DRILLHOLE ID: **MPV-04-214C**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM	TO	RUN	ROCK	TCR	TCR	SCR	SCR	RQD	RQD	IRS			COMMENT
(m)	(m)	(m)	TYPE	(m)	(%)	(m)	(%)	(m)	(%)	STRONG R	WEAK R	% WEAK	
0.00	0.90	0.90	Air										
0.90	2.20	1.30	OB										
2.20	3.70	1.50	Gneiss	1.65	110.0	1.15	76.7	1.00	66.7	5			
3.70	5.20	1.50	Gneiss	1.48	98.7	1.35	90.0	1.19	79.3	5			
5.20	6.70	1.50	Gneiss	1.52	101.3	1.34	89.3	1.19	79.3	5			
6.70	7.45	0.75	Gneiss	0.75	100.0	0.44	58.7	0.44	58.7	5			
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AMEC Photo Log Sheet

Drillhole ID: **MPV-04-214C**

Shift	Camera Photo Number	Filename	Depth (m)	Description
NS 1900-0700	DSCN1904	MPV-04-214_2.20_Dry_1	2.20 - 4.78	
NS 1900-0700	DSCN1905	MPV-04-214_4.78_Dry_2	4.78 - 7.45	

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-214C	1	2.20	4.78
MPV-04-214C	2	4.78	7.45
	3	7.45	
	4		
	5		
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GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	*DESCRIPTION*	*Mpa*
R0	**EXTREMELY WEAK ROCK**	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	**VERY WEAK ROCK**	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	**WEAK ROCK**	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	**MEDIUM STRONG ROCK**	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	**STRONG ROCK**	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	**VERY STRONG ROCK**	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	**EXTREMELY STRONG ROCK**	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY	
CODE	*DESCRIPTION*
0	NONE
1	MINOR
2	MODERATE
3	HEAVY

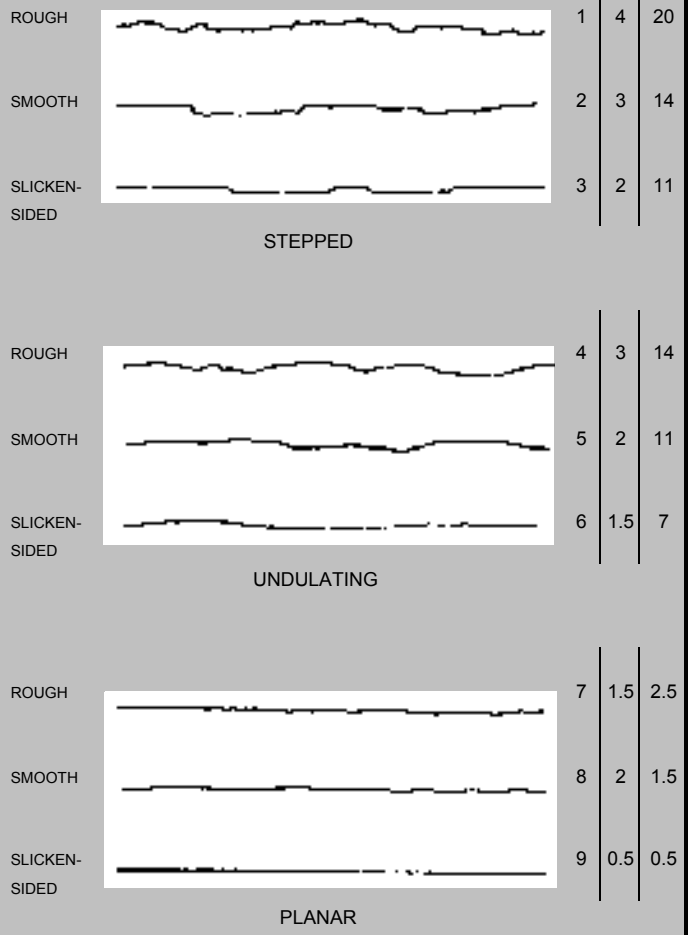
DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	*CATEGORY*
0	STRONG (NEVER BREAKS)
1	MODERATE (SOMETIMES BREAKS)
3	WEAK (ALWAYS BREAKS)

JOINT CONDITION - SMALL SCALE		
CODE	*CATEGORY*	*SUBCATEGORY*
1	STEPPED	ROUGH
2		SMOOTH
3		SLICKENSIDED
4	UNDULATING	ROUGH
5		SMOOTH
6		SLICKENSIDED
7	PLANAR	ROUGH
8		SMOOTH
9		SLICKENSIDED

JOINT FILLING		
CODE	*CATEGORY*	*SUBCATEGORY*
1	NON	COARSE
2	SOFTENING	MEDIUM
3		FINE
4	SOFT	COARSE
5	SHEARED	MEDIUM
6		FINE
7	GOUGE THIKNESS < IRREGULARITIES	
8	GOUGE THIKNESS > IRREGULARITIES	
9	NO INFILL	

JOINT ALTERATION	
CODE	*DESCRIPTION*
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE



	Laubscher	Jr	JRC
ROUGH	1	4	20
SMOOTH	2	3	14
SLICKEN-SIDED	3	2	11
ROUGH	4	3	14
SMOOTH	5	2	11
SLICKEN-SIDED	6	1.5	7
ROUGH	7	1.5	2.5
SMOOTH	8	2	1.5
SLICKEN-SIDED	9	0.5	0.5

SRK STEFFEN, ROBERTSON AND KIRSTEN
Consulting Engineers

MPV_04_214C

amec

FIELD DRILL PERFORMANCE LOG

PROJECT:	Gahcho Kue Geotech
PROJECT NO:	VM00351.H7

HOLE NO:	**MPV-04-215C**
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	05/08/2004 19:00
DATE AND TIME FINISHED:	05/09/2004 0:00
HOLE DIAMETER (mm):	96.1 (HQ)
CORE DIAMETER (mm):	63.5 (HQ)

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
NS 1900-0700	L Sampson	05/09/2004	07:00	12.0	6.0	7.50	DeMob from MPV-04-215C	7.50	6	1.25	12	6	6	0.00

OVERALL HOLE DRILL RATE (m/hr)	0.63
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	1.25

GENERAL GEOTECHNICAL LOG

DRILLHOLE ID: **MPV-04-215C**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM	TO	RUN	ROCK	TCR	TCR	SCR	SCR	RQD	RQD	IRS			COMMENT
(m)	(m)	(m)	TYPE	(m)	(%)	(m)	(%)	(m)	(%)	STRONG R	WEAK R	% WEAK	
0.00	1.25	1.25	Air										
1.25	1.27	0.02	OB										
1.27	3.00	1.73	Gneiss	1.31	75.7	0.76	43.9	0.76	43.9	5			
3.00	4.50	1.50	Gneiss	1.52	101.3	1.13	75.3	0.96	64.0	5			
4.50	6.00	1.50	Gneiss	1.43	95.3	0.45	30.0	0.45	30.0	5			
6.00	7.50	1.50	Gneiss	1.48	98.7	0.81	54.0	0.81	54.0	5			
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AMEC Photo Log Sheet

Drillhole ID: **MPV-04-215C**

Shift	Camera Photo Number	Filename	Depth (m)	Description
NS 1900-0700	DSCN1915	MPV-04-215_1.27_Dry_1	1.27 - 4.50	
NS 1900-0700	dscn1916	MPV-04-214_4.50_Dry_2	4.50 - 7.50	

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-215C	1	1.27	4.50
MPV-04-215C	2	4.50	7.50
	3	7.50	
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GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	*DESCRIPTION*	*Mpa*
R0	**EXTREMELY WEAK ROCK**	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	**VERY WEAK ROCK**	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	**WEAK ROCK**	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	**MEDIUM STRONG ROCK**	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	**STRONG ROCK**	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	**VERY STRONG ROCK**	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	**EXTREMELY STRONG ROCK**	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY	
CODE	*DESCRIPTION*
0	NONE
1	MINOR
2	MODERATE
3	HEAVY

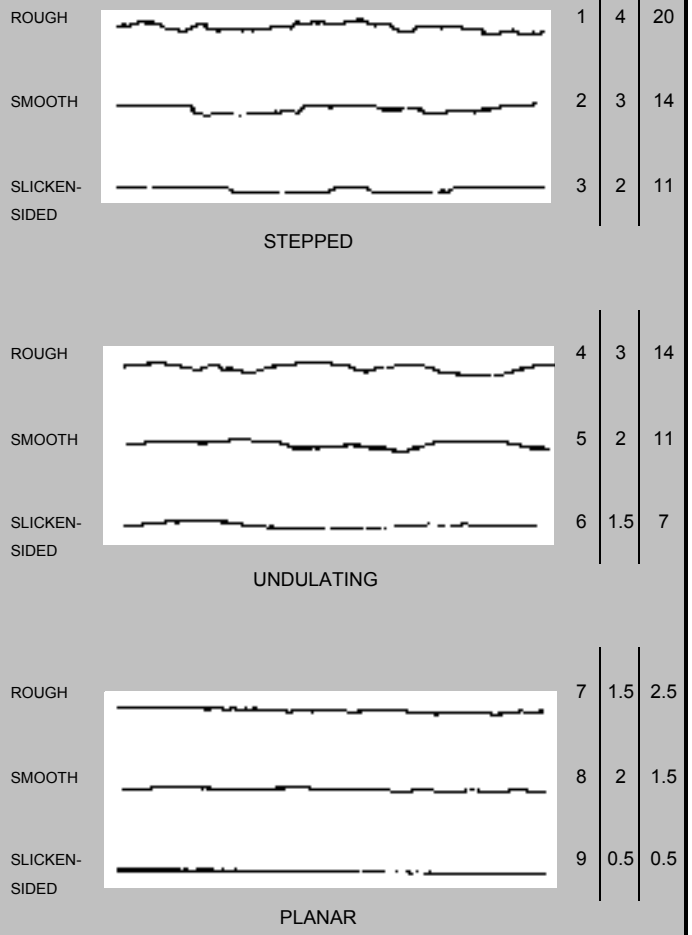
DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	*CATEGORY*
0	STRONG (NEVER BREAKS)
1	MODERATE (SOMETIMES BREAKS)
3	WEAK (ALWAYS BREAKS)

JOINT CONDITION - SMALL SCALE		
CODE	*CATEGORY*	*SUBCATEGORY*
1	STEPPED	ROUGH
2		SMOOTH
3		SLICKENSIDED
4	UNDULATING	ROUGH
5		SMOOTH
6		SLICKENSIDED
7	PLANAR	ROUGH
8		SMOOTH
9		SLICKENSIDED

JOINT FILLING		
CODE	*CATEGORY*	*SUBCATEGORY*
1	NON	COARSE
2	SOFTENING	MEDIUM
3		FINE
4	SOFT	COARSE
5	SHEARED	MEDIUM
6		FINE
7	GOUGE THIKNESS < IRREGULARITIES	
8	GOUGE THIKNESS > IRREGULARITIES	
9	NO INFILL	

JOINT ALTERATION	
CODE	*DESCRIPTION*
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE



	Laubscher	Jr	JRC
ROUGH	1	4	20
SMOOTH	2	3	14
SLICKEN-SIDED	3	2	11
ROUGH	4	3	14
SMOOTH	5	2	11
SLICKEN-SIDED	6	1.5	7
ROUGH	7	1.5	2.5
SMOOTH	8	2	1.5
SLICKEN-SIDED	9	0.5	0.5

SRK STEFFEN, ROBERTSON AND KIRSTEN
Consulting Engineers

MPV_04_215C


MPV-04-215C
May 08, 2004
DEPTH(m)
127-4.5
Box: 1
30
45


MPV-04-215C
May 08, 2004
DEPTH(m)
4.5-7.5
Box: 2
Box 2

amec

FIELD DRILL PERFORMANCE LOG

PROJECT:	Gahcho Kue Geotech
PROJECT NO:	VM00351.H7

HOLE NO:	**MPV-04-216C**
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	05/08/2004 19:00
DATE AND TIME FINISHED:	05/09/2004 2:00
HOLE DIAMETER (mm):	96.1 (HQ)
CORE DIAMETER (mm):	63.5 (HQ)

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
NS 1900-0700	L Sampson	05/09/2004	07:00	12.0	5.0	7.50	DeMob from MPV-04-216C	7.50	7	1.07	12	5	7	0.00

OVERALL HOLE DRILL RATE (m/hr)	0.63
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	1.07

amec

GENERAL GEOTECHNICAL LOG

DRILLHOLE ID: **MPV-04-216C**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	IRS			COMMENT
										STRONG R	WEAK R	% WEAK	
0.00	2.00	2.00	Air										
2.00	2.26	0.26	OB										
2.26	3.00	0.74	Gneiss	0.93	125.7	0.77	104.1	0.77	104.1	5	4	0	
3.00	4.50	1.50	Gneiss	1.34	89.3	1.29	86.0	1.29	86.0	5	4	0	
4.50	6.00	1.50	Gneiss	1.45	96.7	1.04	69.3	0.96	64.0	5	4	0	
6.00	7.50	1.50	Gneiss	1.51	100.7	1.30	86.7	1.22	81.3	5	4	0	
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AMEC Photo Log Sheet

Drillhole ID: **MPV-04-216C**

Shift	Camera Photo Number	Filename	Depth (m)	Description
NS 1900-0700	DSCN1917	MPV-04-216_2.26_Dry_1	2.26 - 5.01	
NS 1900-0700	DSCN1918	MPV-04-216_5.01_Dry_2	5.01 - 7.50	

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-216C	1	2.26	5.01
MPV-04-216C	2	5.01	7.50
	3	7.50	
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GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	*DESCRIPTION*	*Mpa*
R0	**EXTREMELY WEAK ROCK**	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	**VERY WEAK ROCK**	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	**WEAK ROCK**	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	**MEDIUM STRONG ROCK**	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	**STRONG ROCK**	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	**VERY STRONG ROCK**	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	**EXTREMELY STRONG ROCK**	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY	
CODE	*DESCRIPTION*
0	NONE
1	MINOR
2	MODERATE
3	HEAVY

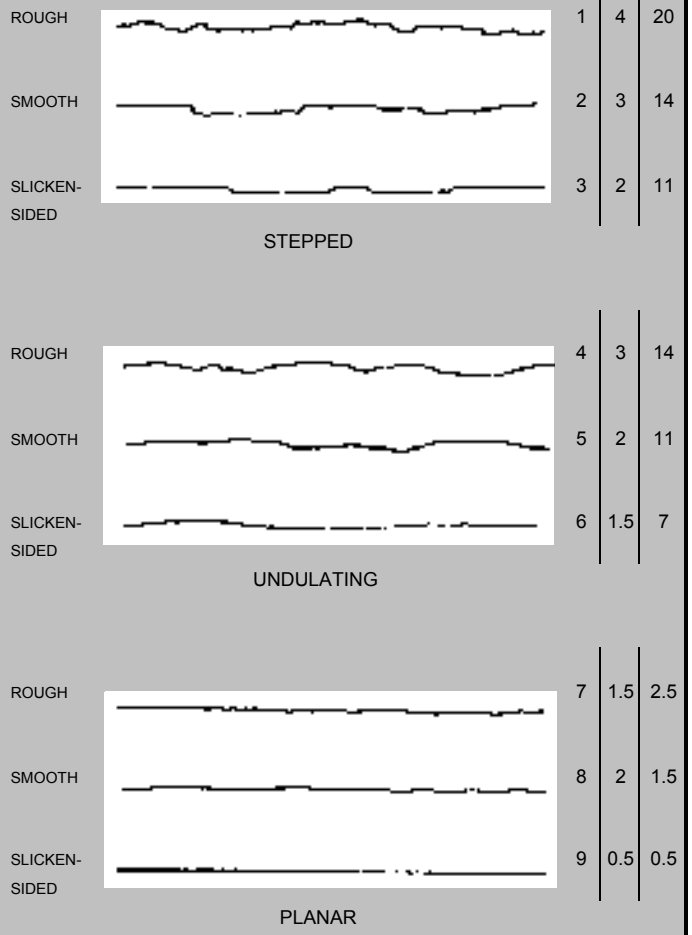
DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	*CATEGORY*
0	STRONG (NEVER BREAKS)
1	MODERATE (SOMETIMES BREAKS)
3	WEAK (ALWAYS BREAKS)

JOINT CONDITION - SMALL SCALE		
CODE	*CATEGORY*	*SUBCATEGORY*
1	STEPPED	ROUGH
2		SMOOTH
3		SLICKENSIDED
4	UNDULATING	ROUGH
5		SMOOTH
6		SLICKENSIDED
7	PLANAR	ROUGH
8		SMOOTH
9		SLICKENSIDED

JOINT FILLING		
CODE	*CATEGORY*	*SUBCATEGORY*
1	NON	COARSE
2	SOFTENING	MEDIUM
3		FINE
4	SOFT	COARSE
5	SHEARED	MEDIUM
6		FINE
7	GOUGE THIKNESS < IRREGULARITIES	
8	GOUGE THIKNESS > IRREGULARITIES	
9	NO INFILL	

JOINT ALTERATION	
CODE	*DESCRIPTION*
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE



	Laubscher	Jr	JRC
ROUGH	1	4	20
SMOOTH	2	3	14
SLICKEN-SIDED	3	2	11
ROUGH	4	3	14
SMOOTH	5	2	11
SLICKEN-SIDED	6	1.5	7
ROUGH	7	1.5	2.5
SMOOTH	8	2	1.5
SLICKEN-SIDED	9	0.5	0.5

SRK STEFFEN, ROBERTSON AND KIRSTEN
Consulting Engineers

MPV_04_216C

amec

FIELD DRILL PERFORMANCE LOG

PROJECT:	Gahcho Kue Geotech
PROJECT NO:	VM00351.H7

HOLE NO:	**MPV-04-217C**
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	05/09/2004 7:00
DATE AND TIME FINISHED:	05/09/2004 19:00
HOLE DIAMETER (mm):	96.1 (HQ)
CORE DIAMETER (mm):	63.5 (HQ)

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
DS 0700-1900	K Barnes	05/09/2004	19:00	12.0	5.0	8.15	Mob/DeMob from MPV-04-217C	8.15	7	1.16	12	5	7	0.00

OVERALL HOLE DRILL RATE (m/hr)	0.68
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	1.16

GENERAL GEOTECHNICAL LOG

DRILLHOLE ID: **MPV-04-217C**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM	TO	RUN	ROCK	TCR	TCR	SCR	SCR	RQD	RQD	IRS			COMMENT
(m)	(m)	(m)	TYPE	(m)	(%)	(m)	(%)	(m)	(%)	STRONG R	WEAK R	% WEAK	
0.00	0.64	0.64	Air										
0.64	2.25	1.61	OB										
2.25	3.75	1.50	Gneiss	1.50	100.0	0.78	52.0	0.53	35.3	5	4	0	
3.75	5.40	1.65	Gneiss	1.65	100.0	1.53	92.7	1.32	80.0	5	4	0	
5.40	6.90	1.50	Gneiss	1.50	100.0	1.34	89.3	1.34	89.3	5	4	0	
6.90	8.15	1.25	Gneiss	1.25	100.0	1.00	80.0	1.00	80.0	5	4	0	
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AMEC Photo Log Sheet

Drillhole ID: **MPV-04-217C**

Shift	Camera Photo Number	Filename	Depth (m)	Description
DS 0700-1900	DSCN1919	MPV-04-217_2.25_Dry_1	2.25 - 4.85	
DS 0700-1900	dscn1920	MPV-04-217_4.85_Dry_2	4.85 - 7.60	
DS 0700-1900	DSCN1921	MPV-04-217_7.60_Dry_3	7.60 - 8.15	

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-217C	1	2.25	4.85
MPV-04-217C	2	4.85	7.60
MPV-04-217C	3	7.60	8.15
	4	8.15	
	5		
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GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	*DESCRIPTION*	*Mpa*
R0	**EXTREMELY WEAK ROCK**	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	**VERY WEAK ROCK**	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	**WEAK ROCK**	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	**MEDIUM STRONG ROCK**	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	**STRONG ROCK**	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	**VERY STRONG ROCK**	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	**EXTREMELY STRONG ROCK**	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY	
CODE	*DESCRIPTION*
0	NONE
1	MINOR
2	MODERATE
3	HEAVY

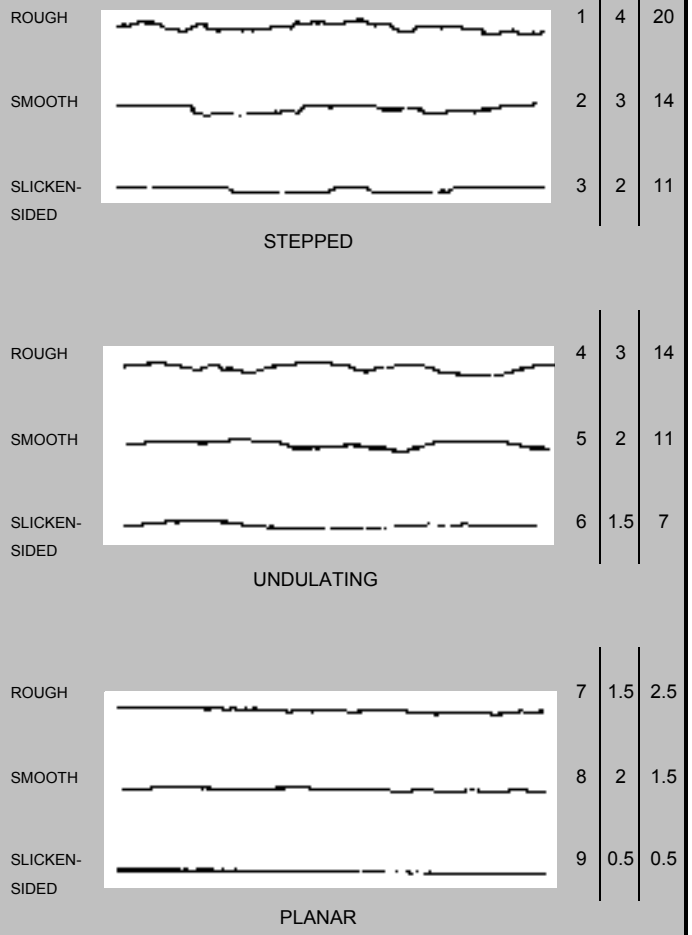
DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	*CATEGORY*
0	STRONG (NEVER BREAKS)
1	MODERATE (SOMETIMES BREAKS)
3	WEAK (ALWAYS BREAKS)

JOINT CONDITION - SMALL SCALE		
CODE	*CATEGORY*	*SUBCATEGORY*
1	STEPPED	ROUGH
2		SMOOTH
3		SLICKENSIDED
4	UNDULATING	ROUGH
5		SMOOTH
6		SLICKENSIDED
7	PLANAR	ROUGH
8		SMOOTH
9		SLICKENSIDED

JOINT FILLING		
CODE	*CATEGORY*	*SUBCATEGORY*
1	NON	COARSE
2	SOFTENING	MEDIUM
3		FINE
4	SOFT	COARSE
5	SHEARED	MEDIUM
6		FINE
7	GOUGE THIKNESS < IRREGULARITIES	
8	GOUGE THIKNESS > IRREGULARITIES	
9	NO INFILL	

JOINT ALTERATION	
CODE	*DESCRIPTION*
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE



	Laubscher	Jr	JRC
ROUGH	1	4	20
SMOOTH	2	3	14
SLICKEN-SIDED	3	2	11
ROUGH	4	3	14
SMOOTH	5	2	11
SLICKEN-SIDED	6	1.5	7
ROUGH	7	1.5	2.5
SMOOTH	8	2	1.5
SLICKEN-SIDED	9	0.5	0.5

SRK STEFFEN, ROBERTSON AND KIRSTEN
Consulting Engineers

MPV_04_217C


MPV-04-217C
09 MAY 04
Box 1
225-485
DRY


MPV-04-217C
09 MAY 04
Box 2
485-760
DRY


MPV-04-217C
09 MAY 04
Box 3
760-815
DRY

FIELD DRILL PERFORMANCE LOG

PROJECT:	Gahcho Kue Geotech
PROJECT NO:	VM00351.H7

HOLE NO:	**MPV-04-218C**
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	05/09/2004 7:00
DATE AND TIME FINISHED:	05/09/2004 19:00
HOLE DIAMETER (mm):	96.1 (HQ)
CORE DIAMETER (mm):	63.5 (HQ)

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
DS 0700-1900	K Barnes	05/09/2004	19:00	12.0	6.0	8.47	Mob/DeMob from MPV-04-218C	8.47	6	1.41	12	6	6	0.00

OVERALL HOLE DRILL RATE (m/hr)	0.71
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	1.41

GENERAL GEOTECHNICAL LOG

DRILLHOLE ID: **MPV-04-218C**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM	TO	RUN	ROCK	TCR	TCR	SCR	SCR	RQD	RQD	IRS			COMMENT
(m)	(m)	(m)	TYPE	(m)	(%)	(m)	(%)	(m)	(%)	STRONG R	WEAK R	% WEAK	
0.00	0.82	0.82	Air										
0.82	2.47	1.65	OB										
2.47	3.25	0.78	OB										
3.25	3.97	0.72	Gneiss	0.72	100.0	0.58	80.6	0.50	69.4	5	4	0	
3.97	5.47	1.50	Gneiss	1.58	105.3	1.31	87.3	1.05	70.0	5	4	0	
5.47	6.97	1.50	Gneiss	1.50	100.0	1.44	96.0	1.26	84.0	5	4	0	
6.97	8.47	1.50	Gneiss	1.50	100.0	1.26	84.0	1.26	84.0	5	4	0	
		0.00											
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AMEC Photo Log Sheet

Drillhole ID: **MPV-04-218C**

Shift	Camera Photo Number	Filename	Depth (m)	Description
DS 0700-1900	DSCN1922	MPV-04-218_3.25_Dry_1	3.25 - 5.80	
DS 0700-1900	dscn1923	MPV-04-218_5.80_Dry_2	5.80 - 8.47	

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-218C	1	3.25	5.80
MPV-04-218C	2	5.80	8.47
	3	8.47	
	4		
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GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	*DESCRIPTION*	*Mpa*
R0	**EXTREMELY WEAK ROCK**	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	**VERY WEAK ROCK**	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	**WEAK ROCK**	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	**MEDIUM STRONG ROCK**	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	**STRONG ROCK**	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	**VERY STRONG ROCK**	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	**EXTREMELY STRONG ROCK**	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY	
CODE	*DESCRIPTION*
0	NONE
1	MINOR
2	MODERATE
3	HEAVY

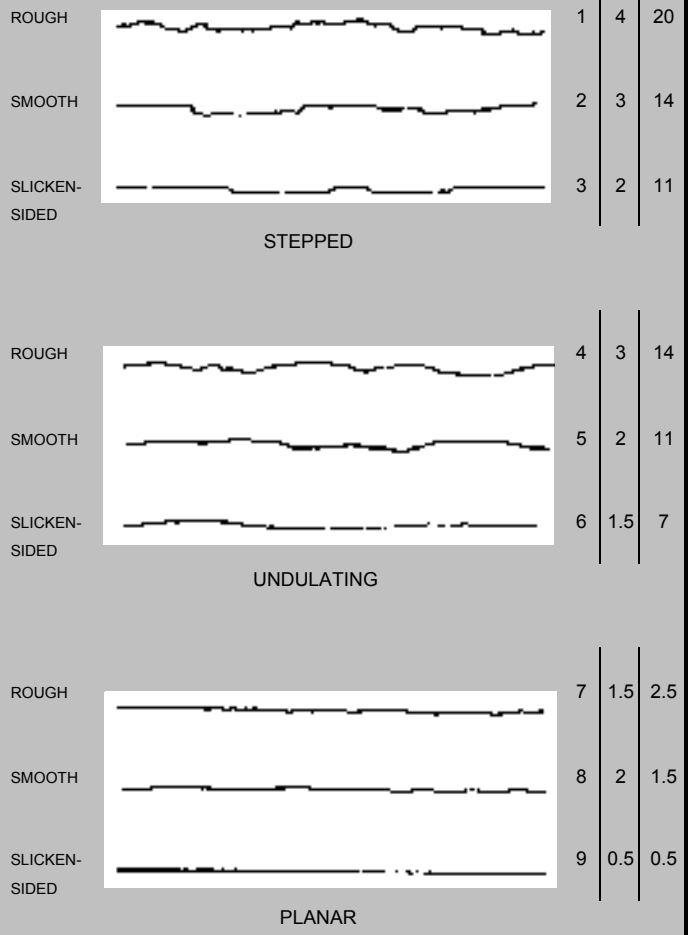
DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	*CATEGORY*
0	STRONG (NEVER BREAKS)
1	MODERATE (SOMETIMES BREAKS)
3	WEAK (ALWAYS BREAKS)

JOINT CONDITION - SMALL SCALE		
CODE	*CATEGORY*	*SUBCATEGORY*
1	STEPPED	ROUGH
2		SMOOTH
3		SLICKENSIDED
4	UNDULATING	ROUGH
5		SMOOTH
6		SLICKENSIDED
7	PLANAR	ROUGH
8		SMOOTH
9		SLICKENSIDED

JOINT FILLING		
CODE	*CATEGORY*	*SUBCATEGORY*
1	NON	COARSE
2	SOFTENING	MEDIUM
3		FINE
4	SOFT	COARSE
5	SHEARED	MEDIUM
6		FINE
7	GOUGE THIKNESS < IRREGULARITIES	
8	GOUGE THIKNESS > IRREGULARITIES	
9	NO INFILL	

JOINT ALTERATION	
CODE	*DESCRIPTION*
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE



	Laubscher	Jr	JRC
ROUGH	1	4	20
SMOOTH	2	3	14
SLICKEN-SIDED	3	2	11
ROUGH	4	3	14
SMOOTH	5	2	11
SLICKEN-SIDED	6	1.5	7
ROUGH	7	1.5	2.5
SMOOTH	8	2	1.5
SLICKEN-SIDED	9	0.5	0.5

SRK STEFFEN, ROBERTSON AND KIRSTEN
Consulting Engineers

MPV_04_218C

amec

FIELD DRILL PERFORMANCE LOG

PROJECT:	Gahcho Kue Geotech
PROJECT NO:	VM00351.H7

HOLE NO:	**MPV-04-219C**
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	05/09/2004 19:00
DATE AND TIME FINISHED:	05/10/2004 7:00
HOLE DIAMETER (mm):	96.1 (HQ)
CORE DIAMETER (mm):	63.5 (HQ)

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
NS 1900-0700	L Sampson	05/10/2004	07:00	12.0	6.0	7.50	Mob/DeMob from MPV-04-219C	7.50	6	1.25	12	6	6	0.00

OVERALL HOLE DRILL RATE (m/hr)	0.63
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	1.25

GENERAL GEOTECHNICAL LOG

DRILLHOLE ID: **MPV-04-219C**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM	TO	RUN	ROCK	TCR	TCR	SCR	SCR	RQD	RQD	IRS			COMMENT
(m)	(m)	(m)	TYPE	(m)	(%)	(m)	(%)	(m)	(%)	STRONG R	WEAK R	% WEAK	
0.00	0.90	0.90	Air										
0.90	1.90	1.00	OB										
1.90	3.00	1.10	Gneiss	1.10	100.0	0.94	85.5	0.94	85.5	5	4	0	
3.00	4.50	1.50	Gneiss	1.50	100.0	1.09	72.7	1.01	67.3	5	4	0	
4.50	6.00	1.50	Gneiss	1.50	100.0	1.03	68.7	0.89	59.3	5	4	0	
6.00	7.50	1.50	Gneiss	1.50	100.0	0.95	63.3	0.88	58.7	5	4	0	
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AMEC Photo Log Sheet

Drillhole ID: **MPV-04-219C**

Shift	Camera Photo Number	Filename	Depth (m)	Description
NS 1900-0700	DSCN1924	MPV-04-219_1.90_Dry_1	1.90 - 4.50	
NS 1900-0700	dscn1925	MPV-04-219_4.50_Dry_2	4.50 - 7.50	

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-219C	1	1.90	4.50
MPV-04-219C	2	4.50	7.50
	3	7.50	
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GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	*DESCRIPTION*	*Mpa*
R0	**EXTREMELY WEAK ROCK**	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	**VERY WEAK ROCK**	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	**WEAK ROCK**	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	**MEDIUM STRONG ROCK**	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	**STRONG ROCK**	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	**VERY STRONG ROCK**	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	**EXTREMELY STRONG ROCK**	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY	
CODE	*DESCRIPTION*
0	NONE
1	MINOR
2	MODERATE
3	HEAVY

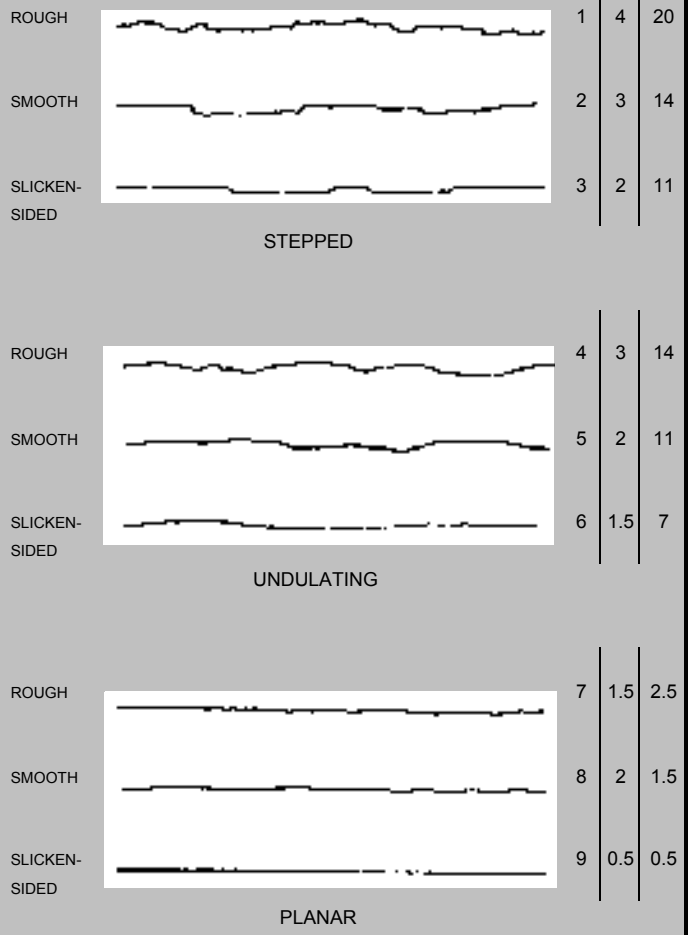
DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	*CATEGORY*
0	STRONG (NEVER BREAKS)
1	MODERATE (SOMETIMES BREAKS)
3	WEAK (ALWAYS BREAKS)

JOINT CONDITION - SMALL SCALE		
CODE	*CATEGORY*	*SUBCATEGORY*
1	STEPPED	ROUGH
2		SMOOTH
3		SLICKENSIDED
4	UNDULATING	ROUGH
5		SMOOTH
6		SLICKENSIDED
7	PLANAR	ROUGH
8		SMOOTH
9		SLICKENSIDED

JOINT FILLING		
CODE	*CATEGORY*	*SUBCATEGORY*
1	NON	COARSE
2	SOFTENING	MEDIUM
3		FINE
4	SOFT	COARSE
5	SHEARED	MEDIUM
6		FINE
7	GOUGE THIKNESS < IRREGULARITIES	
8	GOUGE THIKNESS > IRREGULARITIES	
9	NO INFILL	

JOINT ALTERATION	
CODE	*DESCRIPTION*
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE



	Laubscher	Jr	JRC
ROUGH	1	4	20
SMOOTH	2	3	14
SLICKEN-SIDED	3	2	11
ROUGH	4	3	14
SMOOTH	5	2	11
SLICKEN-SIDED	6	1.5	7
ROUGH	7	1.5	2.5
SMOOTH	8	2	1.5
SLICKEN-SIDED	9	0.5	0.5

SRK STEFFEN, ROBERTSON AND KIRSTEN
Consulting Engineers

MPV_04_219C


MPV-04-219C
May 09, 2004
DEPTH(m)
1.90-45
Box: 1


MPV-04-219C
May 09, 2004
DEPTH(m)
4.5-7.5
Box: 2

amec

FIELD DRILL PERFORMANCE LOG

PROJECT:	Gahcho Kue Geotech
PROJECT NO:	VM00351.H7

HOLE NO:	**MPV-04-220C**
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	05/10/2004 7:00
DATE AND TIME FINISHED:	05/10/2004 22:00
HOLE DIAMETER (mm):	96.1 (HQ)
CORE DIAMETER (mm):	63.5 (HQ)

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
DS 0700-1900	K Barnes	05/10/2004	19:00	12.0	4.0	8.94	Mob to MPV-04-220C	8.94	8	1.12	12	4	8	0.00
NS 1900-0700	L Sampson	05/11/2004	07:00	12.0	5.0	10.44	DeMob from MPV-04-220C	1.5	7	0.21	24	9	15	0.70

OVERALL HOLE DRILL RATE (m/hr)	0.44
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	0.70

GENERAL GEOTECHNICAL LOG

DRILLHOLE ID: **MPV-04-220C**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM	TO	RUN	ROCK	TCR	TCR	SCR	SCR	RQD	RQD	IRS			COMMENT
(m)	(m)	(m)	TYPE	(m)	(%)	(m)	(%)	(m)	(%)	STRONG R	WEAK R	% WEAK	
0.00	0.81	0.81	Air										
0.81	2.81	2.00	OB										
2.81	4.19	1.38	OB										Boulders
4.19	5.05	0.86	OB										
5.05	5.36	0.31	Gneiss	0.30	96.8	0.29	93.5	0.22	71.0	5	4		
5.36	6.86	1.50	Gneiss	1.35	90.0	0.98	65.3	0.73	48.7	5	4		
6.86	7.44	0.58	Gneiss	0.58	100.0	0.58	100.0	0.58	100.0	5	4		
7.44	8.94	1.50	Gneiss	1.50	100.0	1.37	91.3	1.37	91.3	5	4		
8.94	10.44	1.50	Gneiss	1.50	100.0	0.86	57.3	0.86	57.3	5	4		
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AMEC Photo Log Sheet

Drillhole ID: **MPV-04-220C**

Shift	Camera Photo Number	Filename	Depth (m)	Description
NS 1900-0700	DSCN1964	MPV-04-220_2.00_Dry_1	2.00 - 5.27	
NS 1900-0700	DSCN1965	MPV-04-220_5.27_Dry_2	5.27 - 8.07	
NS 1900-0700	DSCN1966	MPV-04-220_8.07_Dry_3	8.07 - 10.44	

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-220C	1	2.00	5.27
MPV-04-220C	2	5.27	8.07
MPV-04-220C	3	8.07	10.44
	4	10.44	
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GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	*DESCRIPTION*	*Mpa*
R0	**EXTREMELY WEAK ROCK**	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	**VERY WEAK ROCK**	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	**WEAK ROCK**	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	**MEDIUM STRONG ROCK**	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	**STRONG ROCK**	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	**VERY STRONG ROCK**	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	**EXTREMELY STRONG ROCK**	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY	
CODE	*DESCRIPTION*
0	NONE
1	MINOR
2	MODERATE
3	HEAVY

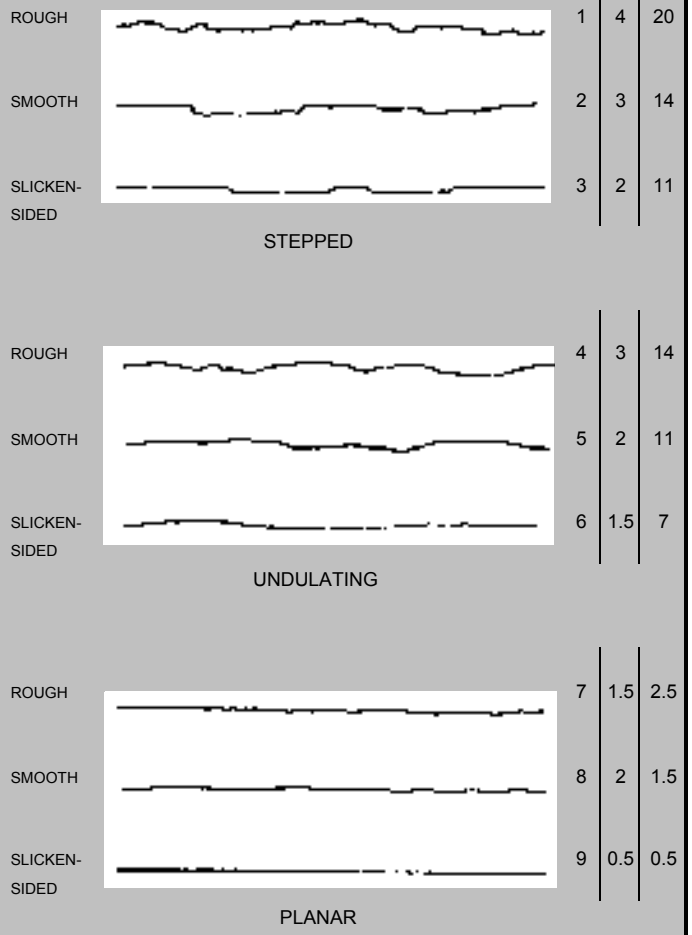
DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	*CATEGORY*
0	STRONG (NEVER BREAKS)
1	MODERATE (SOMETIMES BREAKS)
3	WEAK (ALWAYS BREAKS)

JOINT CONDITION - SMALL SCALE		
CODE	*CATEGORY*	*SUBCATEGORY*
1	STEPPED	ROUGH
2		SMOOTH
3		SLICKENSIDED
4	UNDULATING	ROUGH
5		SMOOTH
6		SLICKENSIDED
7	PLANAR	ROUGH
8		SMOOTH
9		SLICKENSIDED

JOINT FILLING		
CODE	*CATEGORY*	*SUBCATEGORY*
1	NON	COARSE
2	SOFTENING	MEDIUM
3		FINE
4	SOFT	COARSE
5	SHEARED	MEDIUM
6		FINE
7	GOUGE THIKNESS < IRREGULARITIES	
8	GOUGE THIKNESS > IRREGULARITIES	
9	NO INFILL	

JOINT ALTERATION	
CODE	*DESCRIPTION*
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE



	Laubscher	Jr	JRC
ROUGH	1	4	20
SMOOTH	2	3	14
SLICKEN-SIDED	3	2	11
ROUGH	4	3	14
SMOOTH	5	2	11
SLICKEN-SIDED	6	1.5	7
ROUGH	7	1.5	2.5
SMOOTH	8	2	1.5
SLICKEN-SIDED	9	0.5	0.5

SRK STEFFEN, ROBERTSON AND KIRSTEN
Consulting Engineers

MPV_04_220C


MPV-04-220C
10 mm 04
Box 1
20-527
DRY


MPV-04-220C
10 mm 04
Box 2
527-807
DRY


MPV-04-220C
10 mm 04
Box 3
807-1044
DRY

amec

FIELD DRILL PERFORMANCE LOG

PROJECT:	Gahcho Kue Geotech
PROJECT NO:	VM00351.H7

HOLE NO:	**MPV-04-221C**
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	05/10/2004 7:00
DATE AND TIME FINISHED:	05/11/2004 0:00
HOLE DIAMETER (mm):	96.1 (HQ)
CORE DIAMETER (mm):	63.5 (HQ)

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
DS 0700-1900	K Barnes	05/10/2004	19:00	12.0	8.0	3.25	Auger stuck in ice, Mob to MPV-04-221C	3.25	4	0.81	12	8	4	0.00
NS 1900-0700	L Sampson	05/11/2004	07:00	12.0	7.0	9.25	DeMob from MPV-04-221C	6	5	1.20	24	15	9	1.03

OVERALL HOLE DRILL RATE (m/hr)	0.39
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	1.03

amec

GENERAL GEOTECHNICAL LOG

DRILLHOLE ID: **MPV-04-221C**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	IRS			COMMENT
										STRONG R	WEAK R	% WEAK	
0.00	1.65	1.65	Air										
1.65	2.25	0.60	OB										
2.25	3.25	1.00	OB										
3.25	4.75	1.50	Gneiss	1.50	100.0	0.58	38.7	0.51	34.0	5	4		Highly fractured
4.75	6.25	1.50	Gneiss	1.31	87.3	0.25	16.7	0.18	12.0	5	4		Highly fractured
6.25	7.75	1.50	Gneiss	1.49	99.3	1.28	85.3	1.21	80.7	5	4		
7.75	9.25	1.50	Gneiss	1.50	100.0	1.44	96.0	1.30	86.7	5	4		
		0.00											
		0.00											
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AMEC Photo Log Sheet

Drillhole ID: **MPV-04-221C**

Shift	Camera Photo Number	Filename	Depth (m)	Description
NS 1900-0700	DSCN1961	MPV-04-221_2.25_Dry_1	2.25 - 4.98	
NS 1900-0700	DSCN1962	MPV-04-221_4.98_Dry_2	4.98 - 7.75	
NS 1900-0700	DSCN1963	MPV-04-221_7.75_Dry_3	7.75 - 9.25	

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-221C	1	2.25	4.98
MPV-04-221C	2	4.98	7.75
MPV-04-221C	3	7.75	9.25
	4	9.25	
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GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	*DESCRIPTION*	*Mpa*
R0	**EXTREMELY WEAK ROCK**	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	**VERY WEAK ROCK**	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	**WEAK ROCK**	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	**MEDIUM STRONG ROCK**	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	**STRONG ROCK**	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	**VERY STRONG ROCK**	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	**EXTREMELY STRONG ROCK**	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY	
CODE	*DESCRIPTION*
0	NONE
1	MINOR
2	MODERATE
3	HEAVY

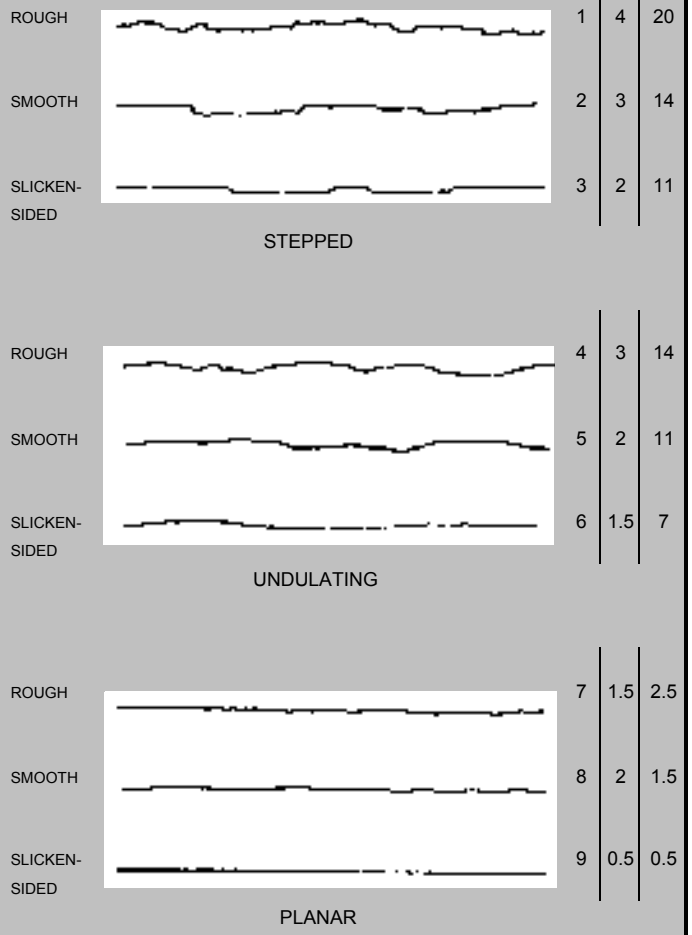
DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	*CATEGORY*
0	STRONG (NEVER BREAKS)
1	MODERATE (SOMETIMES BREAKS)
3	WEAK (ALWAYS BREAKS)

JOINT CONDITION - SMALL SCALE		
CODE	*CATEGORY*	*SUBCATEGORY*
1	STEPPED	ROUGH
2		SMOOTH
3		SLICKENSIDED
4	UNDULATING	ROUGH
5		SMOOTH
6		SLICKENSIDED
7	PLANAR	ROUGH
8		SMOOTH
9		SLICKENSIDED

JOINT FILLING		
CODE	*CATEGORY*	*SUBCATEGORY*
1	NON	COARSE
2	SOFTENING	MEDIUM
3		FINE
4	SOFT	COARSE
5	SHEARED	MEDIUM
6		FINE
7	GOUGE THIKNESS < IRREGULARITIES	
8	GOUGE THIKNESS > IRREGULARITIES	
9	NO INFILL	

JOINT ALTERATION	
CODE	*DESCRIPTION*
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE



	Laubscher	Jr	JRC
ROUGH	1	4	20
SMOOTH	2	3	14
SLICKEN-SIDED	3	2	11
ROUGH	4	3	14
SMOOTH	5	2	11
SLICKEN-SIDED	6	1.5	7
ROUGH	7	1.5	2.5
SMOOTH	8	2	1.5
SLICKEN-SIDED	9	0.5	0.5

SRK STEFFEN, ROBERTSON AND KIRSTEN
Consulting Engineers

MPV_04_221C


MPV-04-221C
May 10, 2004
DEPTH(m)
225-498
Box: 1


MPV-04-221C
May 10, 2004
DEPTH(m)
4.98-7.75
Box: 2


MPV-04-221C
May 10, 2004
DEPTH(m)
7.75-9.25
Box: 3

FIELD DRILL PERFORMANCE LOG

PROJECT:	Gahcho Kue Geotech
PROJECT NO:	VM00351.H7

HOLE NO:	**MPV-04-222C**
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	05/11/2004 7:00
DATE AND TIME FINISHED:	05/10/2004 22:00
HOLE DIAMETER (mm):	96.1 (HQ)
CORE DIAMETER (mm):	63.5 (HQ)

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
DS 0700-1900	K Barnes	05/11/2004	19:00	12.0	5.0	4.70	Fog / Mob to MPV-04-222C	4.70	7	0.67	12	5	7	0.00
NS 1900-0700	L Sampson	05/12/2004	07:00	12.0	8.0	8.34	DeMob from MPV-04-222C	3.64	4	0.91	24	13	11	0.76

OVERALL HOLE DRILL RATE (m/hr)	0.35
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	0.76

GENERAL GEOTECHNICAL LOG

DRILLHOLE ID: **MPV-04-222C**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM	TO	RUN	ROCK	TCR	TCR	SCR	SCR	RQD	RQD	IRS			COMMENT
(m)	(m)	(m)	TYPE	(m)	(%)	(m)	(%)	(m)	(%)	STRONG R	WEAK R	% WEAK	
0.00	0.50	0.50	Air										
0.50	3.00	2.50	OB										
3.00	3.84	0.84	Gneiss	0.84	100.0	0.67	79.8	0.67	79.8	5	4		
3.84	5.34	1.50	Gneiss	1.49	99.3	1.13	75.3	0.92	61.3	5	4		
5.34	6.84	1.50	Gneiss	1.45	96.7	0.18	12.0	0.18	12.0	5	4		
6.84	8.34	1.50	Gneiss	1.47	98.0	0.72	48.0	0.72	48.0	5	4		
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AMEC Photo Log Sheet

Drillhole ID: **MPV-04-222C**

Shift	Camera Photo Number	Filename	Depth (m)	Description
NS 1900-0700	DSCN1969	MPV-04-222_3.00_Dry_1	3.00 - 5.34	
NS 1900-0700	decn1971	MPV-04-222_5.34_Dry_2	5.34 - 8.34	

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-222C	1	3.00	5.34
MPV-04-222C	2	5.34	8.34
	3	8.34	
	4		
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GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	*DESCRIPTION*	*Mpa*
R0	**EXTREMELY WEAK ROCK**	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	**VERY WEAK ROCK**	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	**WEAK ROCK**	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	**MEDIUM STRONG ROCK**	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	**STRONG ROCK**	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	**VERY STRONG ROCK**	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	**EXTREMELY STRONG ROCK**	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY	
CODE	*DESCRIPTION*
0	NONE
1	MINOR
2	MODERATE
3	HEAVY

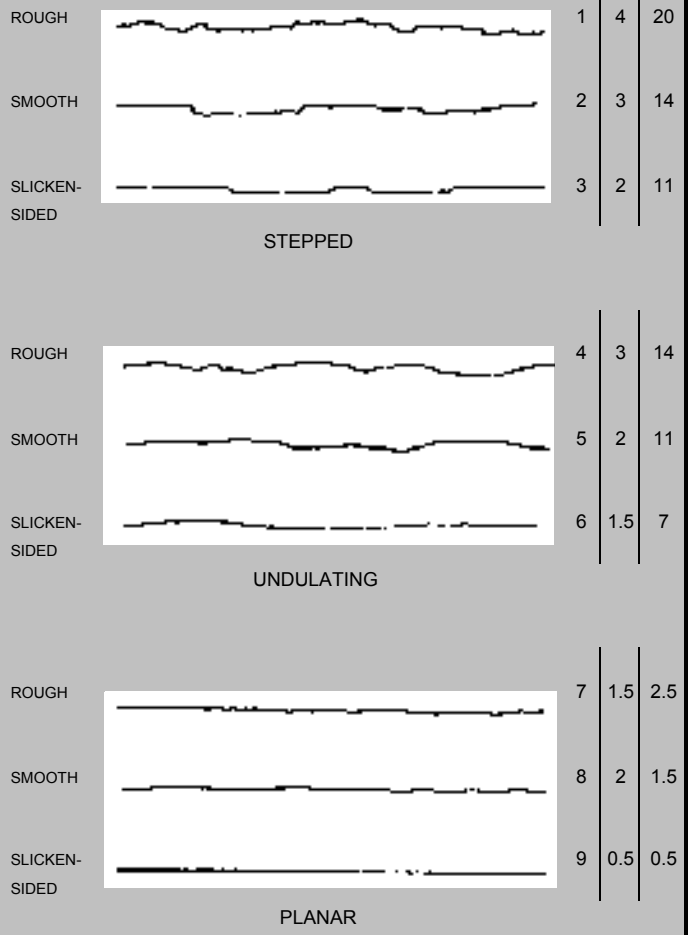
DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	*CATEGORY*
0	STRONG (NEVER BREAKS)
1	MODERATE (SOMETIMES BREAKS)
3	WEAK (ALWAYS BREAKS)

JOINT CONDITION - SMALL SCALE		
CODE	*CATEGORY*	*SUBCATEGORY*
1	STEPPED	ROUGH
2		SMOOTH
3		SLICKENSIDED
4	UNDULATING	ROUGH
5		SMOOTH
6		SLICKENSIDED
7	PLANAR	ROUGH
8		SMOOTH
9		SLICKENSIDED

JOINT FILLING		
CODE	*CATEGORY*	*SUBCATEGORY*
1	NON	COARSE
2	SOFTENING	MEDIUM
3		FINE
4	SOFT	COARSE
5	SHEARED	MEDIUM
6		FINE
7	GOUGE THIKNESS < IRREGULARITIES	
8	GOUGE THIKNESS > IRREGULARITIES	
9	NO INFILL	

JOINT ALTERATION	
CODE	*DESCRIPTION*
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE



	Laubscher	Jr	JRC
ROUGH	1	4	20
SMOOTH	2	3	14
SLICKEN-SIDED	3	2	11
ROUGH	4	3	14
SMOOTH	5	2	11
SLICKEN-SIDED	6	1.5	7
ROUGH	7	1.5	2.5
SMOOTH	8	2	1.5
SLICKEN-SIDED	9	0.5	0.5

SRK STEFFEN, ROBERTSON AND KIRSTEN
Consulting Engineers

MPV_04_222C

FIELD DRILL PERFORMANCE LOG

PROJECT:	Gahcho Kue Geotech
PROJECT NO:	VM00351.H7

HOLE NO:	**MPV-04-223C**
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	05/11/2004 7:00
DATE AND TIME FINISHED:	05/12/2004 7:00
HOLE DIAMETER (mm):	96.1 (HQ)
CORE DIAMETER (mm):	63.5 (HQ)

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
DS 0700-1900	K Barnes	05/11/2004	19:00	12.0	5.0	2.80	Fog / Mob to MPV-04-223C	2.80	7	0.40	12	5	7	0.00
NS 1900-0700	L Sampson	05/12/2004	07:00	12.0	6.0	9.00	DeMob from MPV-04-223C	6.2	6	1.03	24	11	13	0.69

OVERALL HOLE DRILL RATE (m/hr)	0.38
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	0.69

GENERAL GEOTECHNICAL LOG

DRILLHOLE ID: **MPV-04-223C**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM	TO	RUN	ROCK	TCR	TCR	SCR	SCR	RQD	RQD	IRS			COMMENT
(m)	(m)	(m)	TYPE	(m)	(%)	(m)	(%)	(m)	(%)	STRONG R	WEAK R	% WEAK	
0.00	0.46	0.46	Air										
0.46	3.50	3.04	OB										
3.50	4.50	1.00	Gneiss	0.90	90.0	0.71	71.0	0.64	64.0	5	4		
4.50	6.00	1.50	Gneiss	1.37	91.3	1.27	84.7	1.19	79.3	5	4		
6.00	7.50	1.50	Gneiss	1.56	104.0	1.35	90.0	1.27	84.7	5	4		
7.50	9.00	1.50	Gneiss	1.51	100.7	1.45	96.7	1.45	96.7	5	4		
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AMEC Photo Log Sheet

Drillhole ID: **MPV-04-223C**

Shift	Camera Photo Number	Filename	Depth (m)	Description
NS 1900-0700	DSCN1967	MPV-04-223_3.50_Dry_1	3.50 - 6.47	
NS 1900-0700	dscn1968	MPV-04-221_6.47_Dry_2	6.47 - 9.00	

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-223C	1	3.50	6.47
MPV-04-223C	2	6.47	9.00
	3	9.00	
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GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	*DESCRIPTION*	*Mpa*
R0	**EXTREMELY WEAK ROCK**	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	**VERY WEAK ROCK**	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	**WEAK ROCK**	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	**MEDIUM STRONG ROCK**	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	**STRONG ROCK**	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	**VERY STRONG ROCK**	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	**EXTREMELY STRONG ROCK**	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY	
CODE	*DESCRIPTION*
0	NONE
1	MINOR
2	MODERATE
3	HEAVY

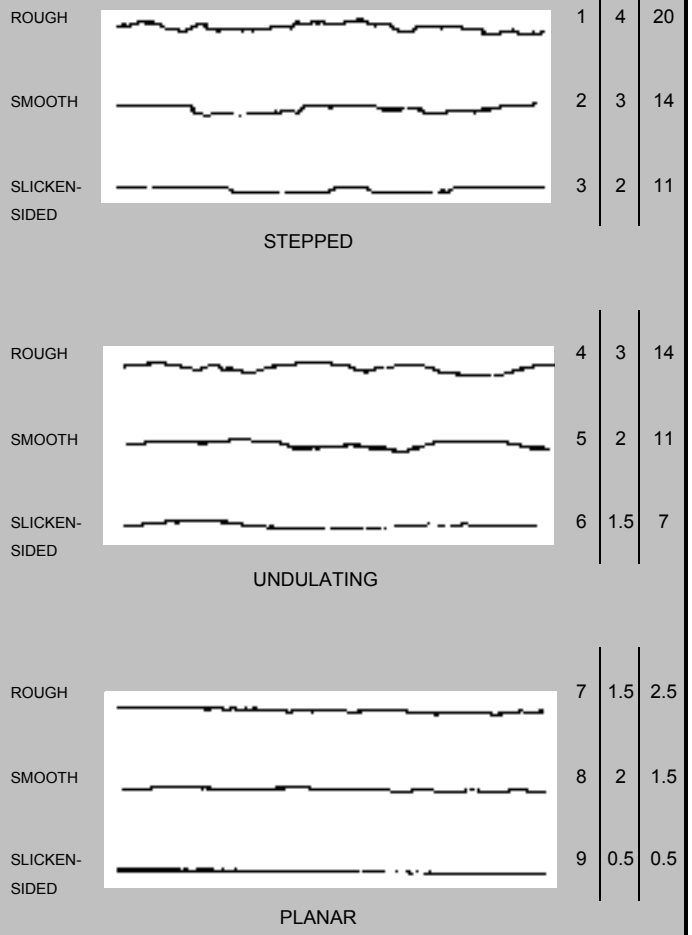
DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	*CATEGORY*
0	STRONG (NEVER BREAKS)
1	MODERATE (SOMETIMES BREAKS)
3	WEAK (ALWAYS BREAKS)

JOINT CONDITION - SMALL SCALE		
CODE	*CATEGORY*	*SUBCATEGORY*
1	STEPPED	ROUGH
2		SMOOTH
3		SLICKENSIDED
4	UNDULATING	ROUGH
5		SMOOTH
6		SLICKENSIDED
7	PLANAR	ROUGH
8		SMOOTH
9		SLICKENSIDED

JOINT FILLING		
CODE	*CATEGORY*	*SUBCATEGORY*
1	NON	COARSE
2	SOFTENING	MEDIUM
3		FINE
4	SOFT	COARSE
5	SHEARED	MEDIUM
6		FINE
7	GOUGE THIKNESS < IRREGULARITIES	
8	GOUGE THIKNESS > IRREGULARITIES	
9	NO INFILL	

JOINT ALTERATION	
CODE	*DESCRIPTION*
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE



	Laubscher	Jr	JRC
ROUGH	1	4	20
SMOOTH	2	3	14
SLICKEN-SIDED	3	2	11
ROUGH	4	3	14
SMOOTH	5	2	11
SLICKEN-SIDED	6	1.5	7
ROUGH	7	1.5	2.5
SMOOTH	8	2	1.5
SLICKEN-SIDED	9	0.5	0.5

SRK STEFFEN, ROBERTSON AND KIRSTEN
Consulting Engineers

MPV_04_223C


MPV-04-223C
May 11, 2004
DEPTH (M)
3.50-6.47
Box # 1


MPV-04-223C
May 11, 2004
DEPTH (M)
6.47-9.00
Box # 1

FIELD DRILL PERFORMANCE LOG

PROJECT:	Gahcho Kue Geotech
PROJECT NO:	VM00351.H7

HOLE NO:	**MPV-04-224C**
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	05/12/2004 7:00
DATE AND TIME FINISHED:	05/12/2004 22:00
HOLE DIAMETER (mm):	96.1 (HQ)
CORE DIAMETER (mm):	63.5 (HQ)

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
DS 0700-1900	K Barnes	05/11/2004	19:00	12.0	5.0	7.00	Fog / Mob to MPV-04-224C	7.00	7	1.00	12	5	7	0.00
NS 1900-0700	L Sampson	05/12/2004	07:00	12.0	9.0	8.07	DeMob from MPV-04-224C	1.07	3	0.36	24	14	10	0.81

OVERALL HOLE DRILL RATE (m/hr)	0.34
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	0.81

GENERAL GEOTECHNICAL LOG

DRILLHOLE ID: **MPV-04-224C**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM	TO	RUN	ROCK	TCR	TCR	SCR	SCR	RQD	RQD	IRS			COMMENT
(m)	(m)	(m)	TYPE	(m)	(%)	(m)	(%)	(m)	(%)	STRONG R	WEAK R	% WEAK	
0.00	0.71	0.71	Air										
0.71	2.84	2.13	OB										
2.84	4.43	1.59	Gneiss	1.47	92.5	1.43	89.9	1.09	68.6	5	4		
4.43	6.00	1.57	Gneiss	1.65	105.1	1.52	96.8	1.50	95.5	5	4		
6.00	7.50	1.50	Gneiss	1.53	102.0	1.38	92.0	1.22	81.3	5	4		
7.50	8.07	0.57	Gneiss	0.57	100.0	0.57	100.0	0.48	84.2	5	4		
		0.00											
		0.00											
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AMEC Photo Log Sheet

Drillhole ID: **MPV-04-224C**

Shift	Camera Photo Number	Filename	Depth (m)	Description
NS 1900-0700	DSCN1972	MPV-04-224_2.84_Dry_1	2.84 - 5.28	
NS 1900-0700	DSCN1974	MPV-04-224_5.28_Dry_2	5.28 - 8.07	

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-224C	1	2.84	5.28
MPV-04-224C	2	5.28	8.07
	3	8.07	
	4		
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	8		
	9		
	10		
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GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	*DESCRIPTION*	*Mpa*
R0	**EXTREMELY WEAK ROCK**	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	**VERY WEAK ROCK**	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	**WEAK ROCK**	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	**MEDIUM STRONG ROCK**	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	**STRONG ROCK**	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	**VERY STRONG ROCK**	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	**EXTREMELY STRONG ROCK**	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY	
CODE	*DESCRIPTION*
0	NONE
1	MINOR
2	MODERATE
3	HEAVY

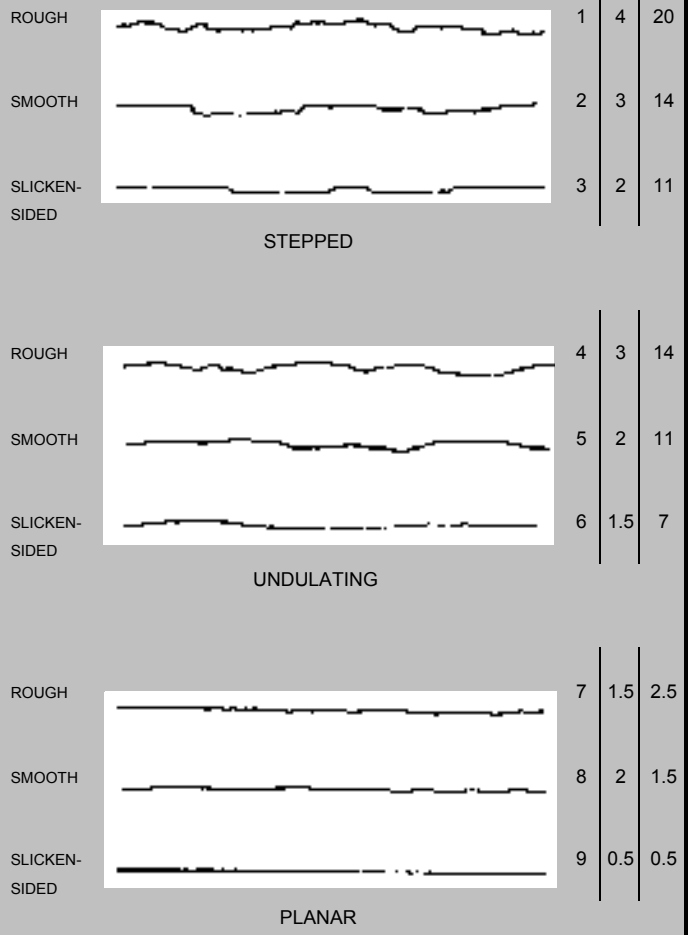
DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	*CATEGORY*
0	STRONG (NEVER BREAKS)
1	MODERATE (SOMETIMES BREAKS)
3	WEAK (ALWAYS BREAKS)

JOINT CONDITION - SMALL SCALE		
CODE	*CATEGORY*	*SUBCATEGORY*
1	STEPPED	ROUGH
2		SMOOTH
3		SLICKENSIDED
4	UNDULATING	ROUGH
5		SMOOTH
6		SLICKENSIDED
7	PLANAR	ROUGH
8		SMOOTH
9		SLICKENSIDED

JOINT FILLING		
CODE	*CATEGORY*	*SUBCATEGORY*
1	NON	COARSE
2	SOFTENING	MEDIUM
3		FINE
4	SOFT	COARSE
5	SHEARED	MEDIUM
6		FINE
7	GOUGE THIKNESS < IRREGULARITIES	
8	GOUGE THIKNESS > IRREGULARITIES	
9	NO INFILL	

JOINT ALTERATION	
CODE	*DESCRIPTION*
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE



	Laubscher	Jr	JRC
ROUGH	1	4	20
SMOOTH	2	3	14
SLICKEN-SIDED	3	2	11
ROUGH	4	3	14
SMOOTH	5	2	11
SLICKEN-SIDED	6	1.5	7
ROUGH	7	1.5	2.5
SMOOTH	8	2	1.5
SLICKEN-SIDED	9	0.5	0.5

SRK STEFFEN, ROBERTSON AND KIRSTEN
Consulting Engineers

MPV_04_224C

amec

FIELD DRILL PERFORMANCE LOG

PROJECT:	Gahcho Kue Geotech
PROJECT NO:	VM00351.H7

HOLE NO:	**MPV-04-225C**
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	05/12/2004 7:00
DATE AND TIME FINISHED:	05/13/2004 7:00
HOLE DIAMETER (mm):	96.1 (HQ)
CORE DIAMETER (mm):	63.5 (HQ)

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
DS 0700-1900	K Barnes	05/12/2004	19:00	12.0	5.0	2.80	Fog / Mob to MPV-04-225C	2.80	7	0.40	12	5	7	0.00
NS 1900-0700	L Sampson	05/13/2004	07:00	12.0	6.0	8.80	DeMob from MPV-04-225C	6	6	1.00	24	11	13	0.68

OVERALL HOLE DRILL RATE (m/hr)	0.37
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	0.68

GENERAL GEOTECHNICAL LOG

DRILLHOLE ID: **MPV-04-225C**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	IRS STRONG R	IRS WEAK R	IRS % WEAK	COMMENT
0.00	0.74	0.74	Air										
0.74	3.30	2.56	OB										
3.30	4.30	1.00	Gneiss	0.97	97.0	0.97	97.0	0.91	91.0	5	4		
4.30	5.80	1.50	Gneiss	1.42	94.7	1.38	92.0	1.32	88.0	5	4		
5.80	7.30	1.50	Gneiss	1.42	94.7	1.42	94.7	1.42	94.7	5	4		
7.30	8.80	1.50	Gneiss	1.41	94.0	1.36	90.7	1.27	84.7	5	4		
		0.00											
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AMEC Photo Log Sheet

Drillhole ID: **MPV-04-225C**

Shift	Camera Photo Number	Filename	Depth (m)	Description
NS 1900-0700	dscn1976	MPV-04-225_3.30_Dry_1	3.30 - 6.41	
NS 1900-0700	DSCN1977	MPV-04-225_6.41_Dry_2	6.41 - 8.80	

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-225C	1	3.30	6.41
MPV-04-225C	2	6.41	8.80
	3	8.80	
	4		
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GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	*DESCRIPTION*	*Mpa*
R0	**EXTREMELY WEAK ROCK**	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	**VERY WEAK ROCK**	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	**WEAK ROCK**	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	**MEDIUM STRONG ROCK**	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	**STRONG ROCK**	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	**VERY STRONG ROCK**	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	**EXTREMELY STRONG ROCK**	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY	
CODE	*DESCRIPTION*
0	NONE
1	MINOR
2	MODERATE
3	HEAVY

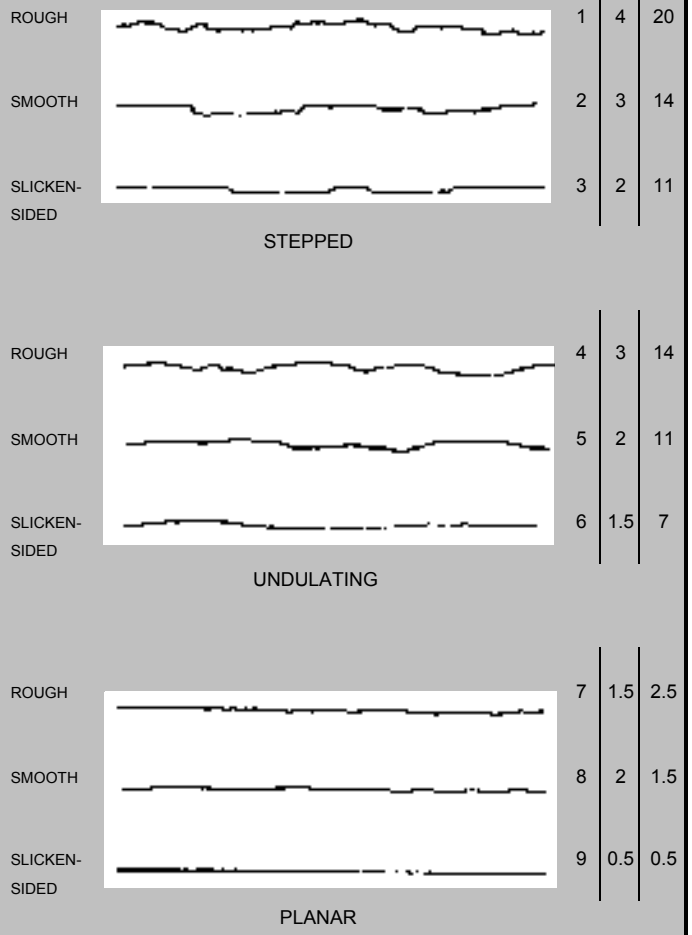
DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	*CATEGORY*
0	STRONG (NEVER BREAKS)
1	MODERATE (SOMETIMES BREAKS)
3	WEAK (ALWAYS BREAKS)

JOINT CONDITION - SMALL SCALE		
CODE	*CATEGORY*	*SUBCATEGORY*
1	STEPPED	ROUGH
2		SMOOTH
3		SLICKENSIDED
4	UNDULATING	ROUGH
5		SMOOTH
6		SLICKENSIDED
7	PLANAR	ROUGH
8		SMOOTH
9		SLICKENSIDED

JOINT FILLING		
CODE	*CATEGORY*	*SUBCATEGORY*
1	NON	COARSE
2	SOFTENING	MEDIUM
3		FINE
4	SOFT	COARSE
5	SHEARED	MEDIUM
6		FINE
7	GOUGE THIKNESS < IRREGULARITIES	
8	GOUGE THIKNESS > IRREGULARITIES	
9	NO INFILL	

JOINT ALTERATION	
CODE	*DESCRIPTION*
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE



	Laubscher	Jr	JRC
ROUGH	1	4	20
SMOOTH	2	3	14
SLICKEN-SIDED	3	2	11
ROUGH	4	3	14
SMOOTH	5	2	11
SLICKEN-SIDED	6	1.5	7
ROUGH	7	1.5	2.5
SMOOTH	8	2	1.5
SLICKEN-SIDED	9	0.5	0.5

SRK STEFFEN, ROBERTSON AND KIRSTEN
Consulting Engineers

MPV_04_225C

FIELD DRILL PERFORMANCE LOG

PROJECT:	Gahcho Kue Geotech
PROJECT NO:	VM00351.H7

HOLE NO:	**MPV-04-226C**
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	05/12/2004 19:00
DATE AND TIME FINISHED:	05/13/2004 7:00
HOLE DIAMETER (mm):	96.1 (HQ)
CORE DIAMETER (mm):	63.5 (HQ)

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
NS 1900-0700	L Sampson	05/12/2004	07:00	12.0	5.0	10.50	Mob to / from MPV-04-226C	10.50	7	1.50	12	5	7	0.00

OVERALL HOLE DRILL RATE (m/hr)	0.88
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	1.50

GENERAL GEOTECHNICAL LOG

DRILLHOLE ID: **MPV-04-226C**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM	TO	RUN	ROCK	TCR	TCR	SCR	SCR	RQD	RQD	IRS			COMMENT
(m)	(m)	(m)	TYPE	(m)	(%)	(m)	(%)	(m)	(%)	STRONG R	WEAK R	% WEAK	
0.00	0.60	0.60	Air										
0.60	4.50	3.90	OB										
4.50	6.00	1.50	Gneiss	1.50	100.0	0.61	40.7	0.61	40.7	5	4		
6.00	7.50	1.50	Gneiss	1.41	94.0	0.53	35.3	0.53	35.3	5	4		
7.50	9.00	1.50	Gneiss	1.48	98.7	0.16	10.7	0.16	10.7	5	4		
9.00	10.50	1.50	Gneiss	1.54	102.7	0.55	36.7	0.55	36.7	5	4		
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AMEC Photo Log Sheet

Drillhole ID: **MPV-04-226C**

Shift	Camera Photo Number	Filename	Depth (m)	Description
NS 1900-0700	DSCN1978	MPV-04-226_4.50_Dry_1	4.50 - 7.02	
NS 1900-0700	dscn1979	MPV-04-226_7.02_Dry_2	7.02 - 10.03	
NS 1900-0700	DSCN1980	MPV-04-226_10.03_Dry_3	10.03 - 10.50	

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-226C	1	4.50	7.02
MPV-04-226C	2	7.02	10.03
MPV-04-226C	3	10.03	10.50
	4	10.50	
	5		
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MPV_04_226C


*MPV-04-226C
May 12, 2004
DEPTH(m)
4.50-7.02
Box: 1


*MPV-04-226C
May 12, 2004
DEPTH(m)
7.02-10.03
Box: 2


*MPV-04-226C
May 12, 2004
DEPTH(m)
10.03-10.50
Box: 3

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FIELD DRILL PERFORMANCE LOG

PROJECT:	Gahcho Kue Geotech
PROJECT NO:	VM00351.H7

HOLE NO:	**MPV-04-227C**
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	05/13/2004 12:00
DATE AND TIME FINISHED:	05/14/2004 7:00
HOLE DIAMETER (mm):	96.1 (HQ)
CORE DIAMETER (mm):	63.5 (HQ)

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
DS 0700-1900	K Barnes	05/13/2004	19:00	12.0	8.0	8.90	Mob to MPV-04-227C	8.90	4	2.23	12	8	4	2.23
NS 1900-0700	L Sampson	05/14/2004	07:00	12.0	2.0	30.00	Demob from MPV-04-227C	21.1	10	2.11	24	10	14	2.14

OVERALL HOLE DRILL RATE (m/hr)	1.25
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	2.14

GENERAL GEOTECHNICAL LOG

DRILLHOLE ID: MPV-04-227C

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	IRS STRONG R	IRS WEAK R	IRS % WEAK	COMMENT
0.00	0.89	0.89	Air										
0.89	5.00	4.11	OB										
5.00	5.60	0.60	Gneiss	0.60	100.0	0.25	41.7	0.25	41.7	5	4	50	
5.60	7.30	1.70	Gneiss	1.70	100.0	0.70	41.2	0.50	29.4	5	4	50	
7.30	8.90	1.60	Gneiss	1.60	100.0	0.50	31.3	0.23	14.4	5	4	50	
8.90	10.50	1.60	Gneiss	1.60	100.0	0.46	28.8	0.27	16.9	5	4	50	
10.50	12.00	1.50	Gneiss	1.55	103.3	0.92	61.3	0.92	61.3	5	4	40	
12.00	13.50	1.50	Gneiss	1.40	93.3	0.99	66.0	0.99	66.0	5	4	40	
13.50	15.00	1.50	Gneiss	1.73	115.3	0.88	58.7	0.88	58.7	5	4	40	
15.00	16.50	1.50	Gneiss	1.56	104.0	0.92	61.3	0.71	47.3	5	4	50	
16.50	18.00	1.50	Gneiss	1.50	100.0	0.73	48.7	0.73	48.7	5	4	50	
18.00	19.50	1.50	Gneiss	1.55	103.3	0.61	40.7	0.61	40.7	5	4	50	
19.50	21.00	1.50	Gneiss	1.55	103.3	1.20	80.0	1.03	68.7	5	4	20	
21.00	22.50	1.50	Gneiss	1.49	99.3	0.98	65.3	0.84	56.0	5	4	40	
22.50	24.00	1.50	Gneiss	1.57	104.7	1.37	91.3	1.30	86.7	5	4	10	
24.00	25.50	1.50	Gneiss	1.68	112.0	0.31	20.7	0.24	16.0	5	4	60	
25.50	27.00	1.50	Gneiss	1.70	113.3	1.12	74.7	1.05	70.0	5	4	10	
27.00	28.50	1.50	Gneiss	1.45	96.7	1.21	80.7	1.21	80.7	5	4	10	
28.50	30.00	1.50	Gneiss	1.69	112.7	1.24	82.7	1.24	82.7	5	4	10	Thermistor installed on completion
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AMEC Photo Log Sheet

Drillhole ID: **MPV-04-227C**

Shift	Camera Photo Number	Filename	Depth (m)	Description
NS 1900-0700	DSCN1983	MPV-04-227_05.00_Dry_1	5.00 - 6.70	
NS 1900-0700	DSCN1984	MPV-04-227_06.70_Dry_2	6.70 - 8.90	
NS 1900-0700	dscn1985	MPV-04-227_08.90_Dry_3	8.90 - 11.67	
NS 1900-0700	DSCN1986	MPV-04-227_11.67_Dry_4	11.67 - 14.50	
NS 1900-0700	DSCN1987	MPV-04-227_14.50_Dry_5	14.50 - 17.10	
NS 1900-0700	DSCN1988	MPV-04-227_17.10_Dry_6	17.10 - 19.68	
NS 1900-0700	DSCN1990	MPV-04-227_19.68_Dry_7	19.68 - 22.50	
NS 1900-0700	DSCN1991	MPV-04-227_22.50_Dry_8	22.50 - 25.26	
NS 1900-0700	DSCN1992	MPV-04-227_25.26_Dry_9	25.26 - 27.68	
NS 1900-0700	DSCN1993	MPV-04-227_27.68_Dry_10	27.68 - 30.00	

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-227C	1	5.00	6.70
MPV-04-227C	2	6.70	8.90
MPV-04-227C	3	8.90	11.67
MPV-04-227C	4	11.67	14.50
MPV-04-227C	5	14.50	17.10
MPV-04-227C	6	17.10	19.68
MPV-04-227C	7	19.68	22.50
MPV-04-227C	8	22.50	25.26
MPV-04-227C	9	25.26	27.68
MPV-04-227C	10	27.68	30.00
	11	30.00	
	12		
	13		
	14		
	15		
	16		
	17		
	18		
	19		
	20		
	21		
	22		
	23		
	24		
	25		
	26		
	27		
	28		
	29		
	30		

GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	*DESCRIPTION*	*Mpa*
R0	**EXTREMELY WEAK ROCK**	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	**VERY WEAK ROCK**	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	**WEAK ROCK**	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	**MEDIUM STRONG ROCK**	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	**STRONG ROCK**	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	**VERY STRONG ROCK**	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	**EXTREMELY STRONG ROCK**	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY	
CODE	*DESCRIPTION*
0	NONE
1	MINOR
2	MODERATE
3	HEAVY

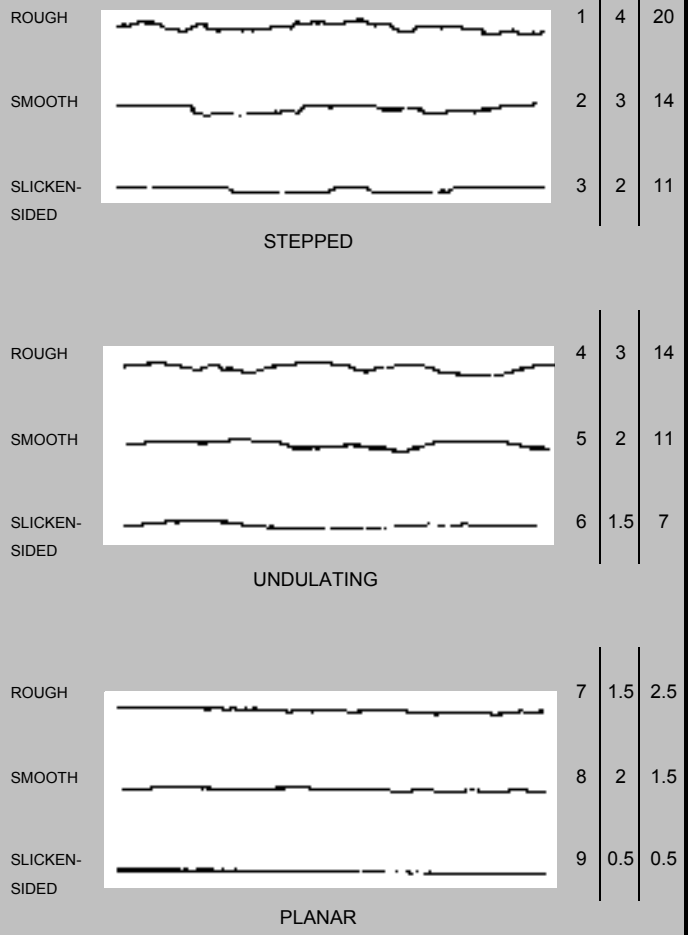
DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	*CATEGORY*
0	STRONG (NEVER BREAKS)
1	MODERATE (SOMETIMES BREAKS)
3	WEAK (ALWAYS BREAKS)

JOINT CONDITION - SMALL SCALE		
CODE	*CATEGORY*	*SUBCATEGORY*
1	STEPPED	ROUGH
2		SMOOTH
3		SLICKENSIDED
4	UNDULATING	ROUGH
5		SMOOTH
6		SLICKENSIDED
7	PLANAR	ROUGH
8		SMOOTH
9		SLICKENSIDED

JOINT FILLING		
CODE	*CATEGORY*	*SUBCATEGORY*
1	NON	COARSE
2	SOFTENING	MEDIUM
3		FINE
4	SOFT	COARSE
5	SHEARED	MEDIUM
6		FINE
7	GOUGE THIKNESS < IRREGULARITIES	
8	GOUGE THIKNESS > IRREGULARITIES	
9	NO INFILL	

JOINT ALTERATION	
CODE	*DESCRIPTION*
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE



	Laubscher	Jr	JRC
ROUGH	1	4	20
SMOOTH	2	3	14
SLICKEN-SIDED	3	2	11
ROUGH	4	3	14
SMOOTH	5	2	11
SLICKEN-SIDED	6	1.5	7
ROUGH	7	1.5	2.5
SMOOTH	8	2	1.5
SLICKEN-SIDED	9	0.5	0.5

SRK STEFFEN, ROBERTSON AND KIRSTEN
Consulting Engineers

MPV_04_227C

MPV_04_227C

MPV_04_227C


MPV-04-227C
May 13, 2004
DRY
Box: 5


MPV-04-227C
May 13, 2004
DRY
Box: 6

MPV_04_227C


MPV-04-227C
May 13, 2004
DRY
Box: 7


MPV-04-227C
May 13, 2004
DRY
Box: 8

MPV_04_227C

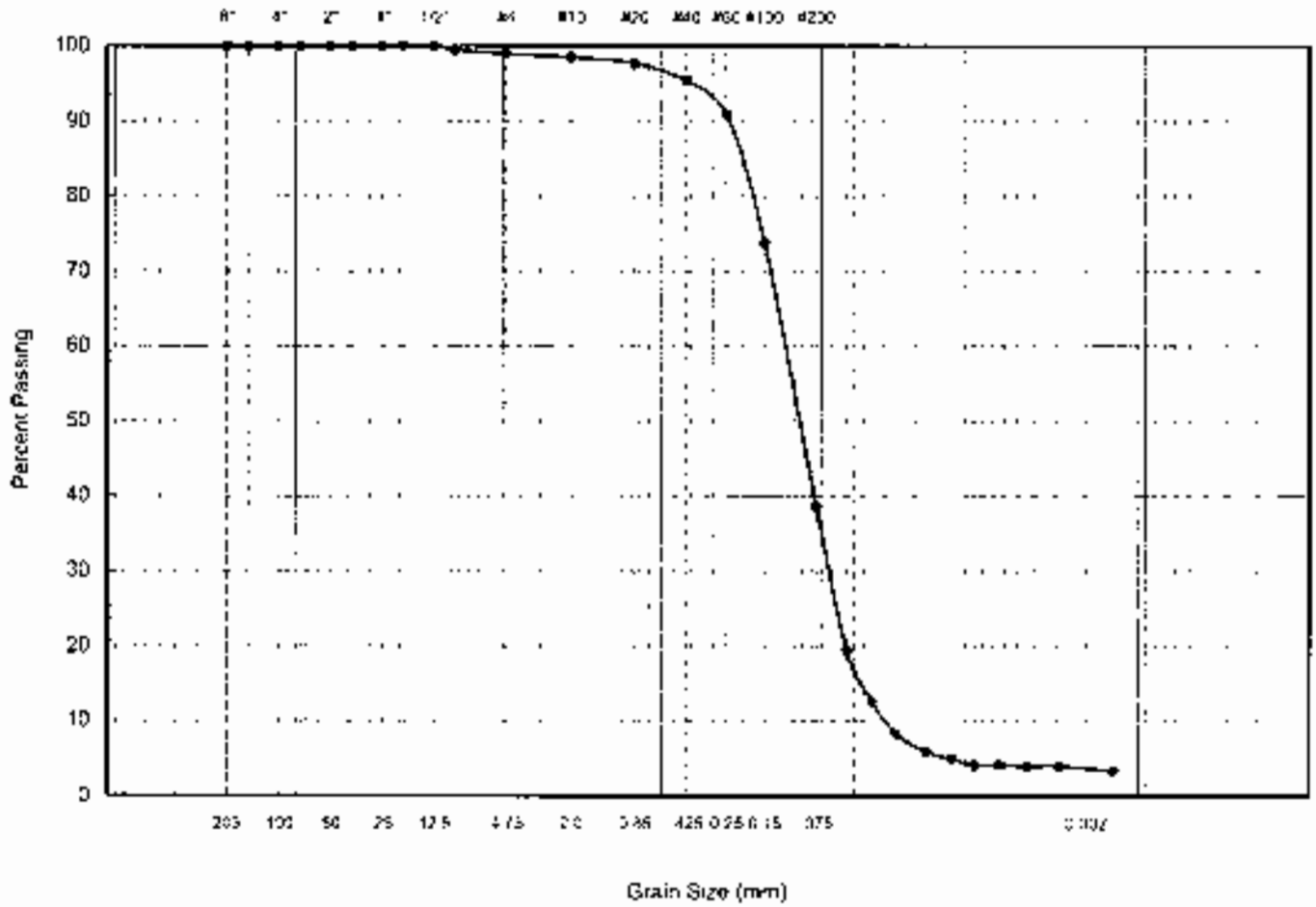

•MPV-04-227C
DEPTH(cm)
May 13, 2004
DRY
Box: 9


•MPV-04-227C
DEPTH(cm)
2768-300
May 13, 2004
DRY
Box: 10

HYDROMETER TEST

AMEC Earth & Environmental

COBBLES	GRAVEL		SAND SIZES			SILT	CLAY
	Coarse	Fine	C	M	F		



Remarks:

Atterberg Limits = Non plastic

Summary					
D10 =	0.0295	mm	Gravel	1	%
D30 =	0.0537	mm	Sand	60	%
D60 =	0.1206	mm	Silt	35	%
Cu =	4.09		Clay	4	%
Cc =	1.14				

Project No: VM00351
Hole No: MPV-04-192
Depth (m): 4.65-4.70

Location: Gahcho Kue Diamond Project
Sample: SA 3
Technician: LR **Date:** 16-Jul-04

SIEVE ANALYSIS REPORT

AMEC Earth & Environmental

To: AMEC E & C Services Ltd.
400 111 Dunsmuir Street
Vancouver, B.C. V6B 5W3

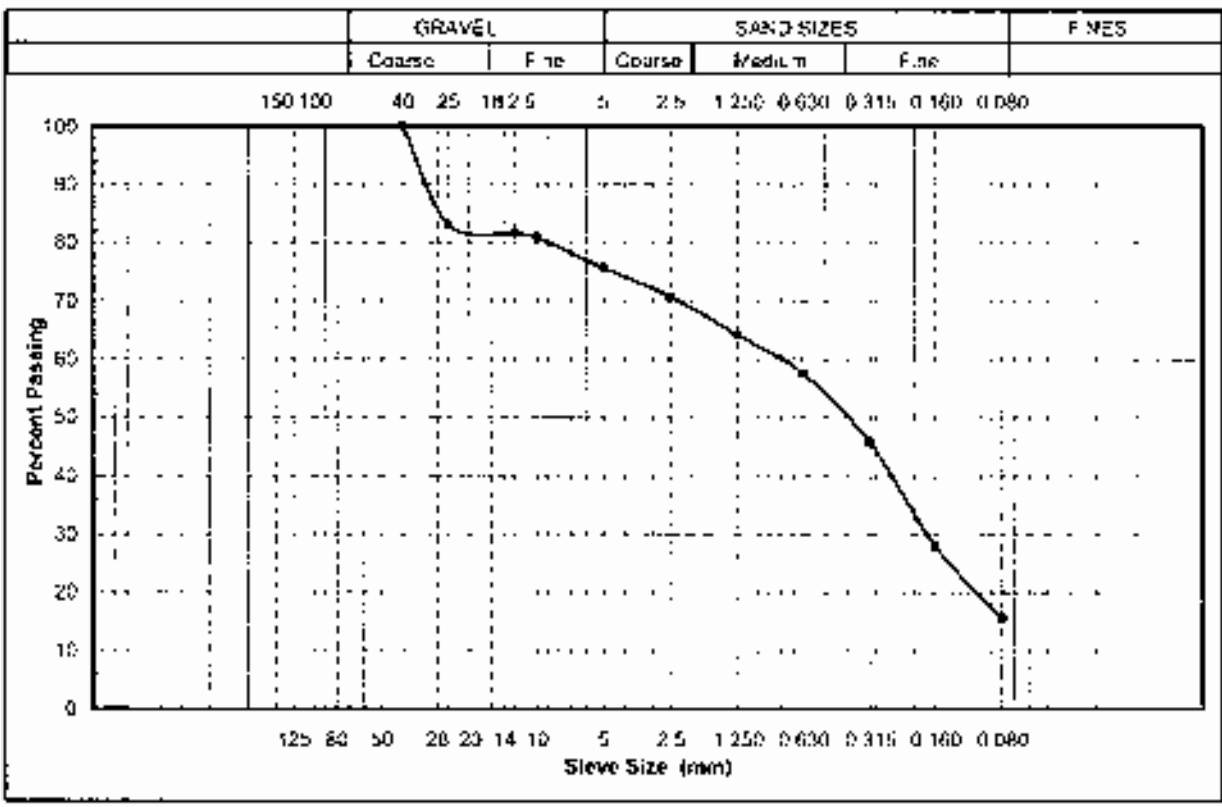
Office : Calgary
Project No: VM00351
Client : AMEC E & C Services Ltd.
Copies to :

Attn: Todd Martin

Project: Gahcho Kue Diamond Project

Sample ID: MPV-04-192, SA 4 **Sample Type:** **Sampled By:** AMEC

Date Sampled: 04-Apr-04 **Date Received:** **Date Tested:** 08-Jul-04



Sieve Size	% Passing
150.0	
125.0	
100.0	
80.0	
50.0	
40.0	100
28.0	
25.0	93
20.0	
16.0	
14.0	
12.5	92
10.0	91
5.0	76
2.5	71
1.250	64
0.630	58
0.315	46
0.160	28
0.080	15.5
C_U	
C_C	

Source: MPV-04-192, Sample 4
Sample Description: 5.9 m - 6.0 m
Comments : No specs.

AMEC Earth & Environmental

Per: _____

SIEVE ANALYSIS REPORT

AMEC Earth & Environmental

To: AMEC E & C Services Ltd.
400 111 Dunsmuir Street
Vancouver, B.C. V6B 5W3

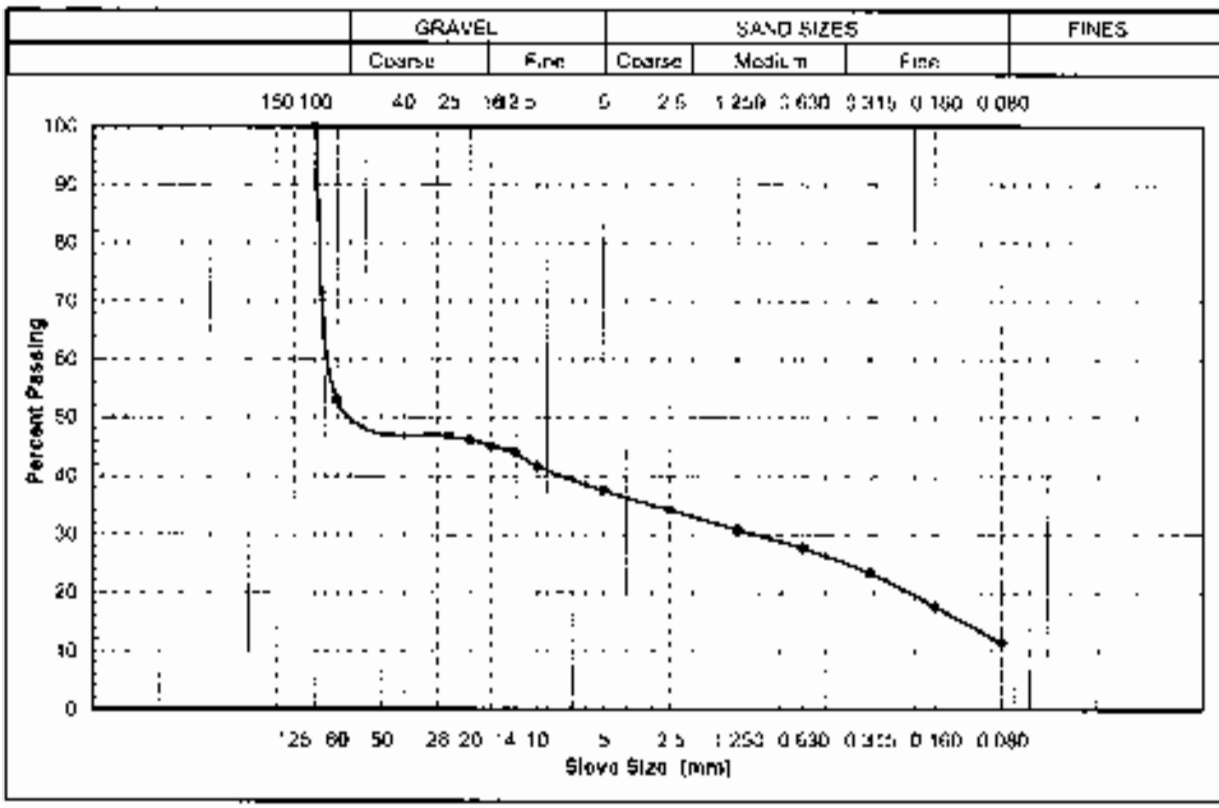
Office : Calgary
Project No: VM00351
Client : AMEC E & C Services Ltd.
Copies to :

Attn: Todd Martin

Project: Gahcho Kue Diamond Project

Sample ID: MPV-04-192, SA 6 **Sample Type:** **Sampled By:** AMEC

Date Sampled: **Date Received:** **Date Tested:** 16-Jul-04



Sieve Size	% Passing
150.0	
125.0	
100.0	100
80.0	53
50.0	
40.0	
28.0	
25.0	47
20.0	46
16.0	45
14.0	
12.5	44
10.0	42
5.0	37
2.5	34
1.250	31
0.630	28
0.315	23
0.160	18
0.080	11.4
C_u	
C_C	

Source: MPV-04-192, Sample 6
Sample Description: 6.65 m - 7.0 m
Comments : No specs.

AMEC Earth & Environmental

Per: _____

SIEVE ANALYSIS REPORT

AMEC Earth & Environmental

To: AMEC E & C Services Ltd.
400 111 Dunsmuir Street
Vancouver, B.C. V6B 5W3

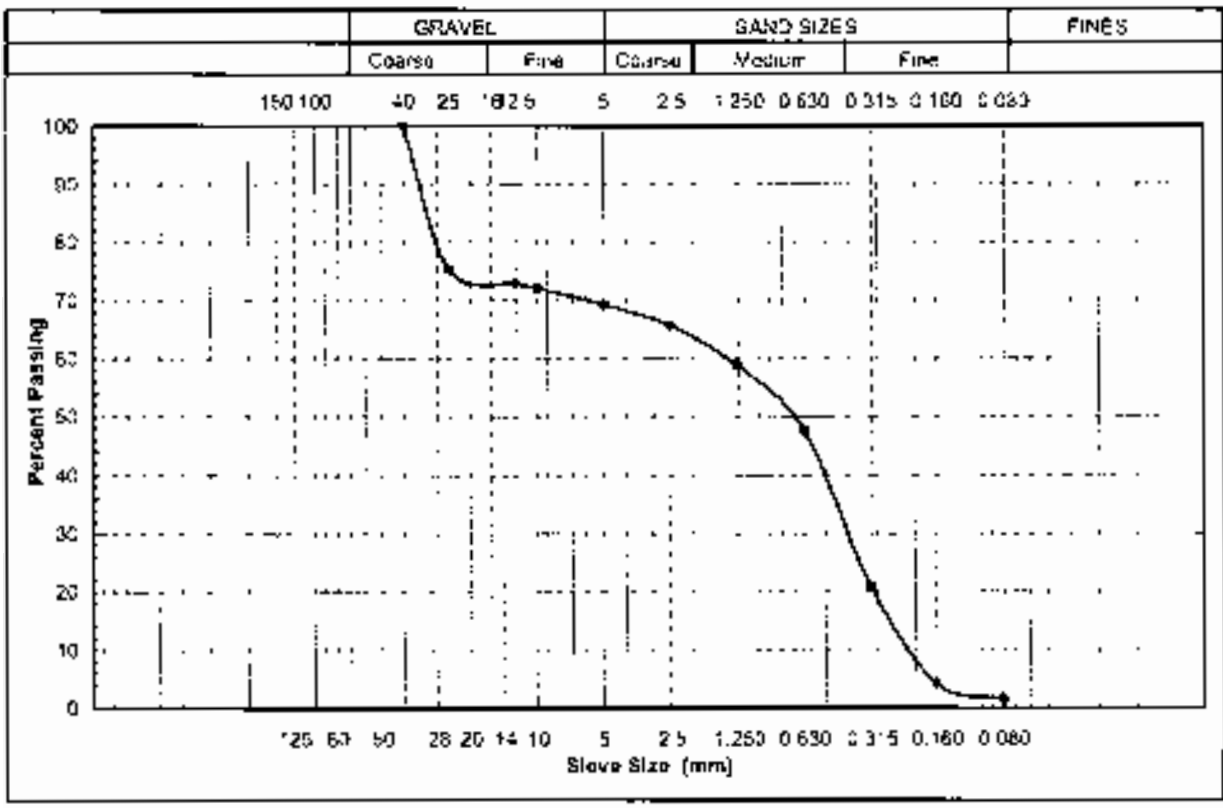
Office : Calgary
Project No: VM00351
Client : AMEC E & C Services Ltd.
Copies to :

Attn: Todd Martin

Project: Gahcho Kue Diamond Project

Sample ID: MPV-04-194, SA 1 **Sample Type:** **Sampled By:** AMEC

Date Sampled: 08-Apr-04 **Date Received:** **Date Tested:** 05-Jul-04



Sieve Size	% Passing
150.0	
125.0	
100.0	
80.0	
50.0	
40.0	100
28.0	
25.0	75
20.0	
16.0	
14.0	
12.5	73
10.0	72
5.0	69
2.5	66
1.250	59
0.630	48
0.315	21
0.160	4
0.080	1.5
C_u	
C_c	

Source: MPV-04-194, Sample 1
Sample Description: 0.95 m - 1.05 m
Comments : No specs.

AMEC Earth & Environmental

Per: _____

SIEVE ANALYSIS REPORT

AMEC Earth & Environmental

amec

To: AMEC E & C Services Ltd.
400 111 Dunsmuir Street
Vancouver, B.C. V6B 5W3

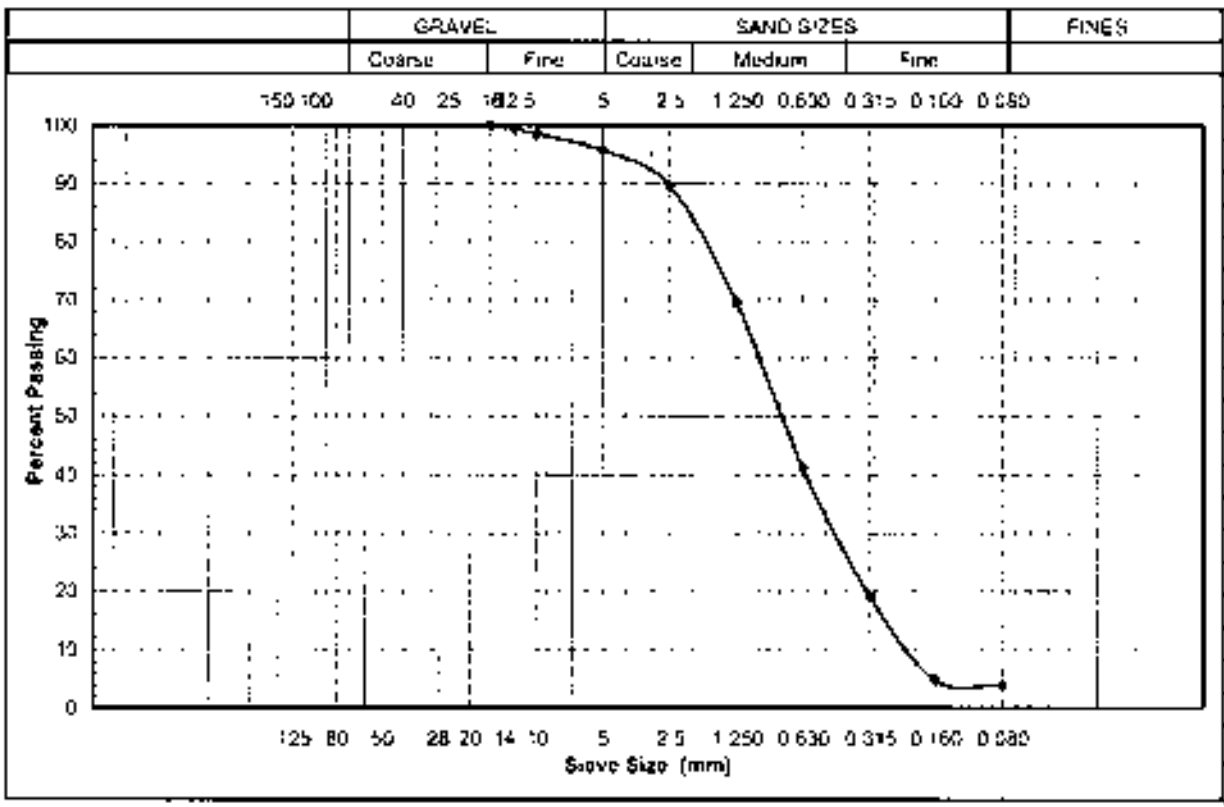
Office : Calgary
Project No: VM00351
Client : AMEC E & C Services Ltd.
Copies to :

Attn: Todd Martin

Project: Gahcho Kue Diamond Project

Sample ID: MPV-04-194, SA 2 **Sample Type:** **Sampled By:** AMEC

Date Sampled: 08-Apr-04 **Date Received:** **Date Tested:** 08-Jul-04



Sieve Size	% Passing
150.0	
125.0	
100.0	
80.0	
50.0	
40.0	
28.0	
25.0	
20.0	
16.0	100
14.0	
12.5	99
10.0	98
5.0	96
2.5	90
1.250	69
0.630	41
0.315	19
0.160	5
0.080	3.8
C_c	
C_U	

Source: MPV-04-194, Sample 2
Sample Description: 1.6 m - 1.7 m
Comments : No specs.

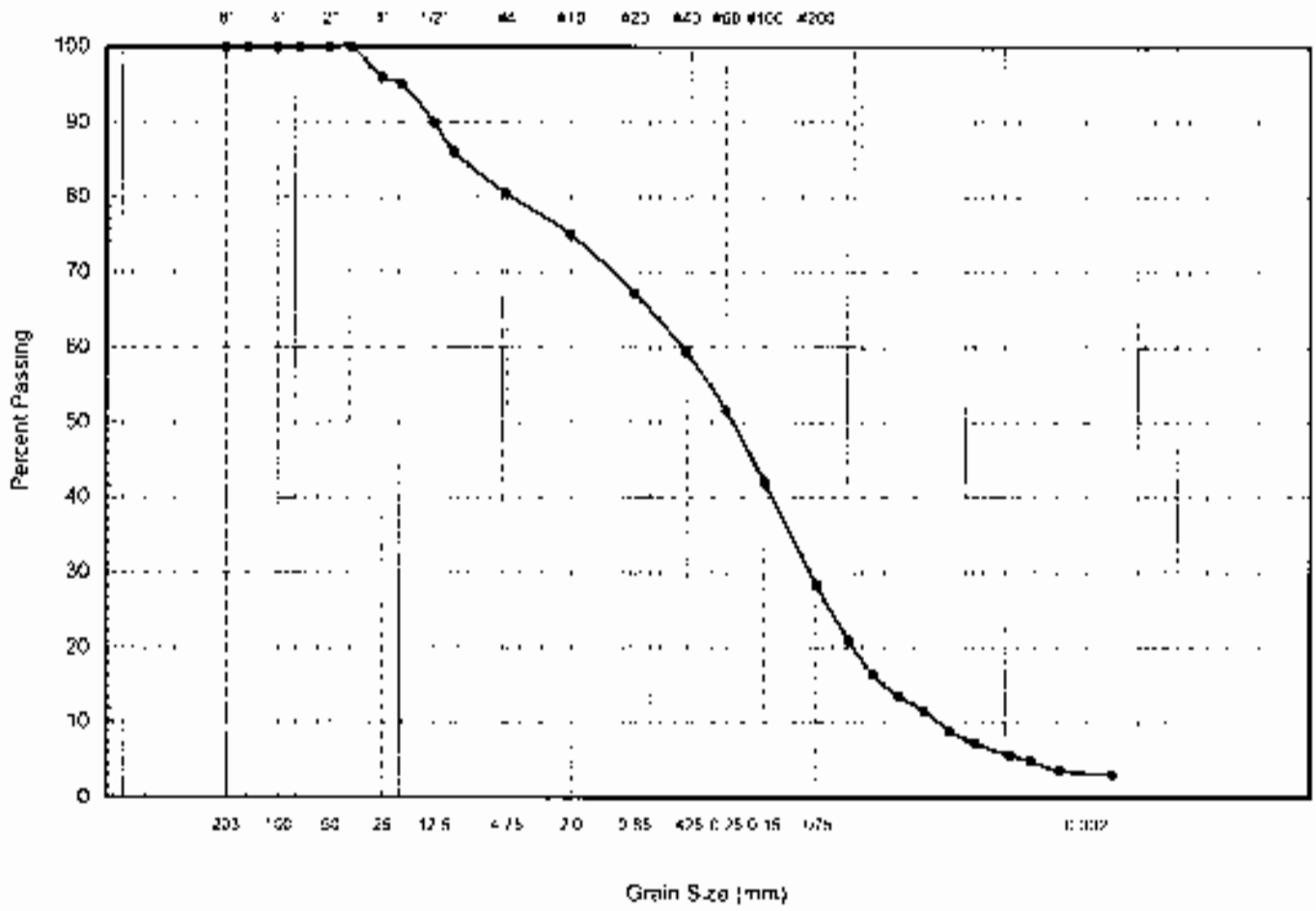
AMEC Earth & Environmental

Per: _____

HYDROMETER TEST

AMEC Earth & Environmental

COBBLES	GRAVEL		SAND SIZES			SILT	CLAY
	Coarse	Fine	C	M	F		



Remarks:

Atterberg Limits = Non plastic

Summary					
D10 =	0.0147	mm	**Gravel**	20	%
D30 =	0.0840	mm	**Sand**	52	%
D60 =	0.4653	mm	**Silt**	25	%
Cu =	31.76		**Clay**	3	%
Cc =	1.03				

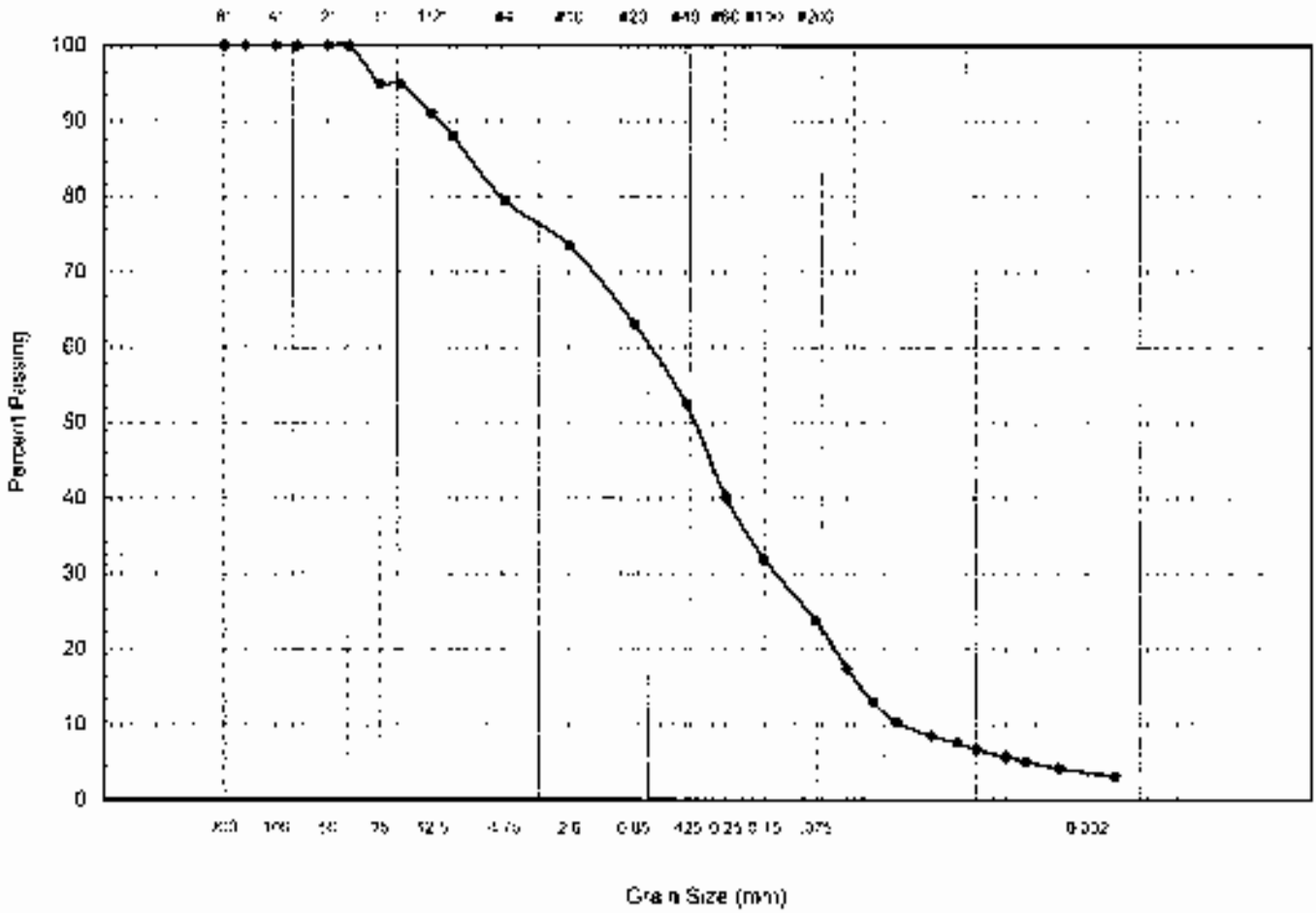
Project No: VM00351
Hole No: MPV-04-195
Depth (m): 0.65-0.75

Location: Gahcho Kue Diamond Project
Sample: SA 1
Technician: LR
Date: 16-Jul-04

HYDROMETER TEST

AMEC Earth & Environmental

COBBLES	GRAVEL		SAND SIZES			SILT	CLAY
	Coarse	Fine	C	M	F		



Remarks:

Summary					
D10 =	0.0240	mm	Gravel	21	%
D30 =	0.1322	mm	Sand	56	%
D60 =	0.7209	mm	Silt	19	%
Cu =	30.02		Clay	4	%
Cc =	1.01				

Project No: VM00351
Hole No: MPV-04-195
Depth (m): 0.9-1.0

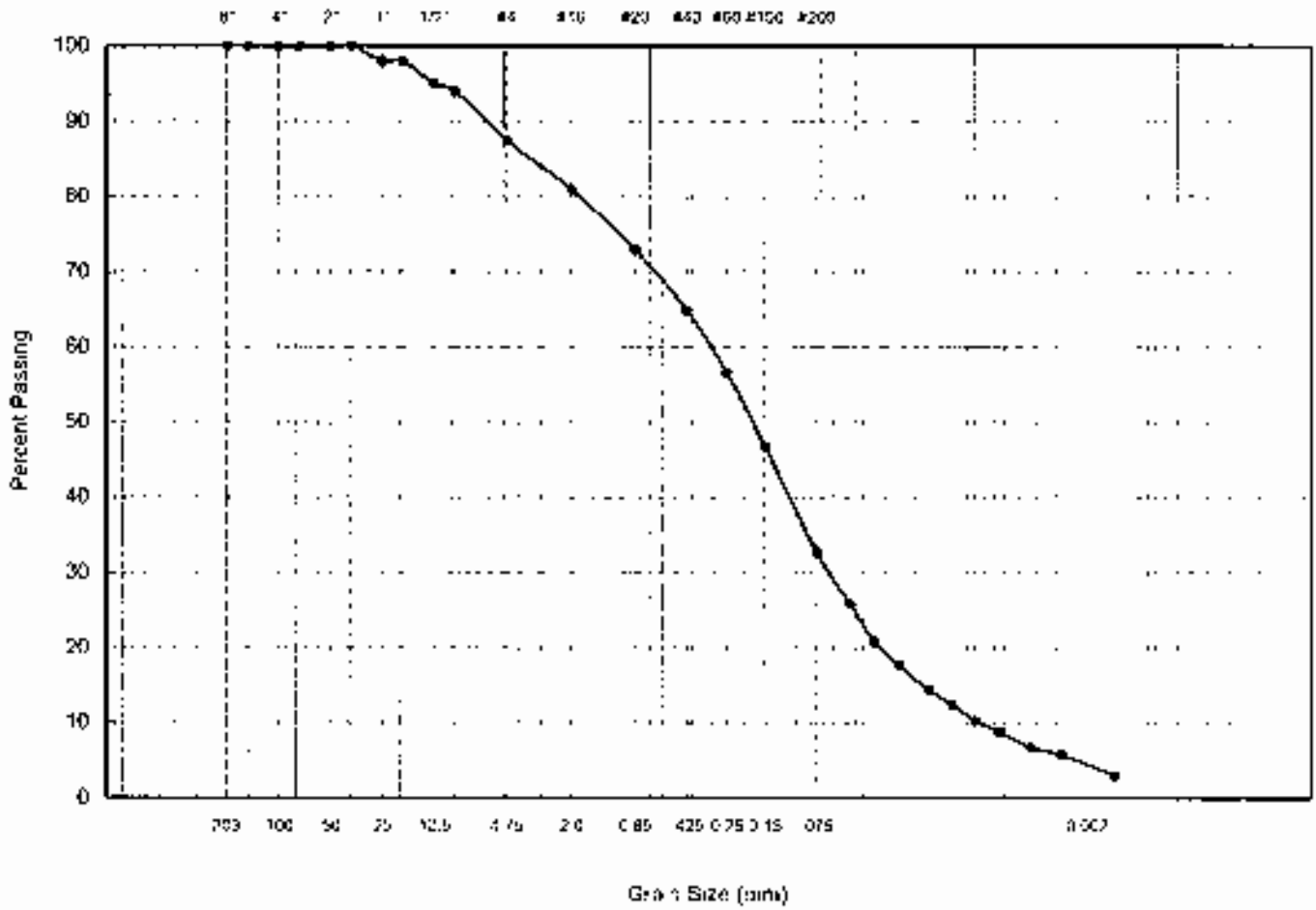
Location: Gahcho Kue Diamond Project
Sample: SA 2
Technician: LR

Date: 16-Jul-04

HYDROMETER TEST

AMEC Earth & Environmental

COBBLES	GRAVEL		SAND SIZES			SILT	CLAY
	Coarse	Fine	C	M	F		



Remarks:

Atterberg Limits = non-plastic

Summary					
D10 =	0.0086	mm	**Gravel**	13	%
D30 =	0.0644	mm	**Sand**	55	%
D60 =	0.3228	mm	**Silt**	28	%
Cu =	37.60		**Clay**	4	%
Cc =	1.50				

Project No: VM00351
Hole No: MPV-04-195
Depth (m): 2.1-2.2

Location: Gahcho Kue Diamond Project
Sample: SA 3
Technician: LR
Date: 16-Jul-04

SIEVE ANALYSIS REPORT

AMEC Earth & Environmental

To: AMEC E & C Services Ltd.
400 111 Dunsmuir Street
Vancouver, B C. V6B 5W3

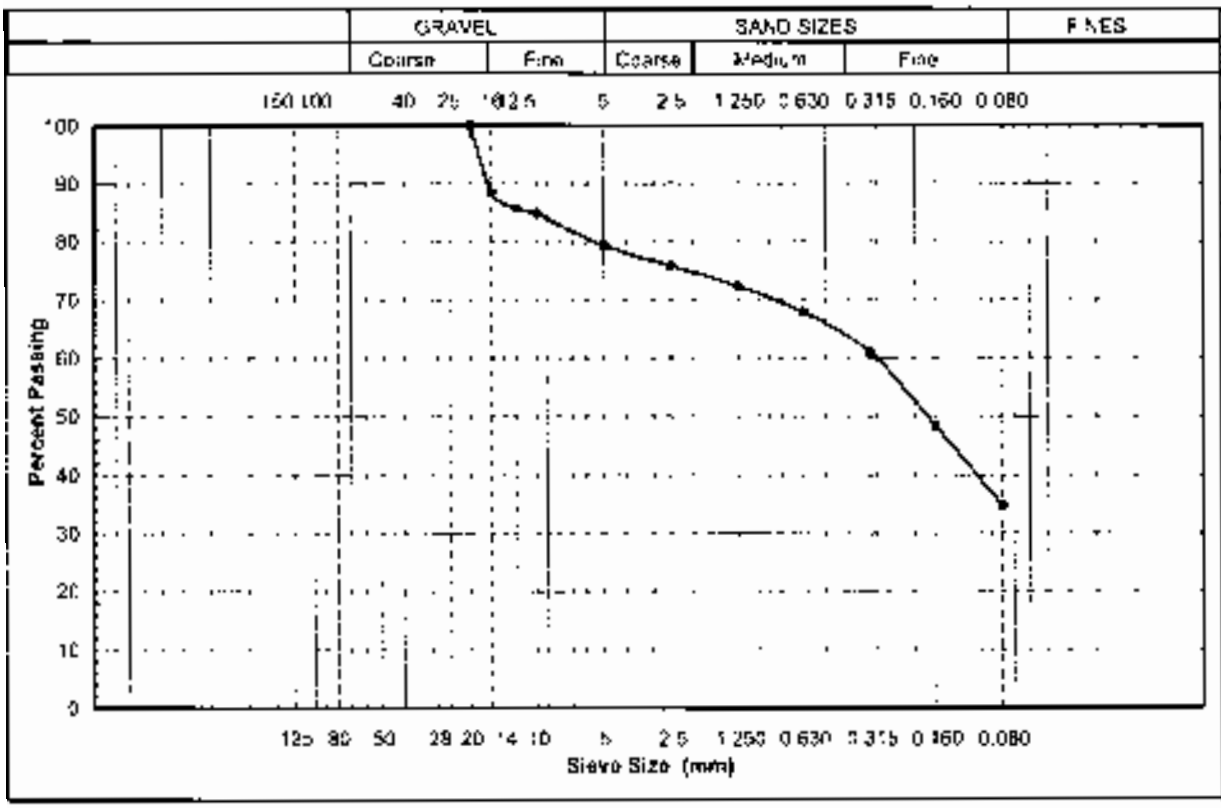
Office : Calgary
Project No: VM00351
Client : AMEC E & C Services Ltd.
Copies to :

Attn: Todd Martin

Project: Gahcho Kue Diamond Project

Sample ID: MPV-04-197, SA 1 **Sample Type:** **Sampled By:** AMEC

Date Sampled: 11-Apr-04 **Date Received:** **Date Tested:** 08-Jul-04



Sieve Size	% Passing
150.0	
125.0	
100.0	
80.0	
50.0	
40.0	
28.0	
25.0	
20.0	100
16.0	89
14.0	
12.5	86
10.0	85
5.0	79
2.5	76
1.250	72
0.630	68
0.315	61
0.160	48
0.080	34.6
C_u	
C_C	

Source: MPV-04-197, Sample 1
Sample Description: 1.08 m - 1.45 m
Comments : No specs.

AMEC Earth & Environmental

Per: _____

SIEVE ANALYSIS REPORT

AMEC Earth & Environmental

To: AMEC E & C Services Ltd.
400 111 Dunsmuir Street
Vancouver, B.C. V6B 5W3

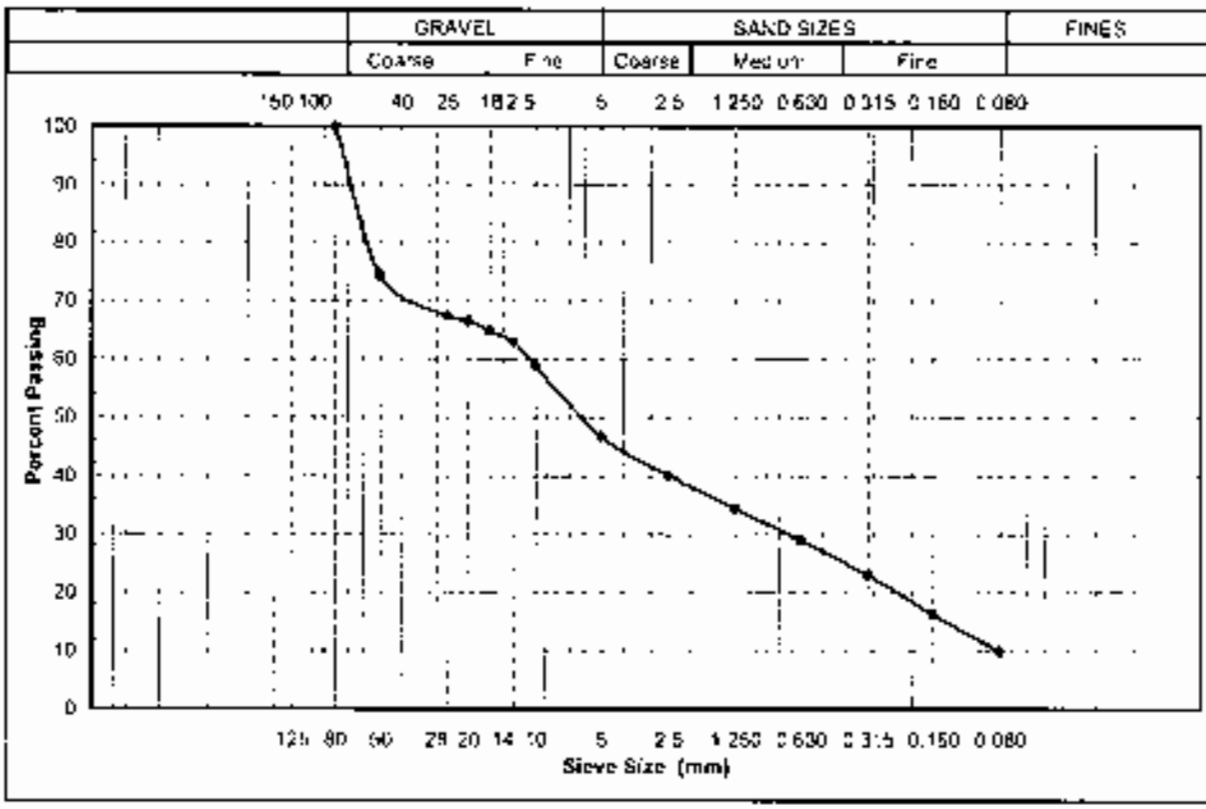
Office : Calgary
Project No: VM00351
Client : AMEC E & C Services Ltd.
Copies to :

Attn: Todd Martin

Project: Gahcho Kue Diamond Project

Sample ID: MPV-04-204, SA 4 **Sample Type:** **Sampled By:** AMEC

Date Sampled: **Date Received:** **Date Tested:** 16-Jul-04



Sieve Size	% Passing
150.0	
125.0	
100.0	
80.0	100
50 0	74
40 0	
28.0	
25.0	67
20 0	67
16.0	65
14.0	
12 5	63
10.0	59
5.0	47
2 5	40
1 250	34
0 630	29
0 315	23
0 160	16
0.080	9 8
C_u	
C_c	

Source: MPV-04-204, Sample 4
Sample Description: 4.0 m - 4.17 m
Comments : No specs.

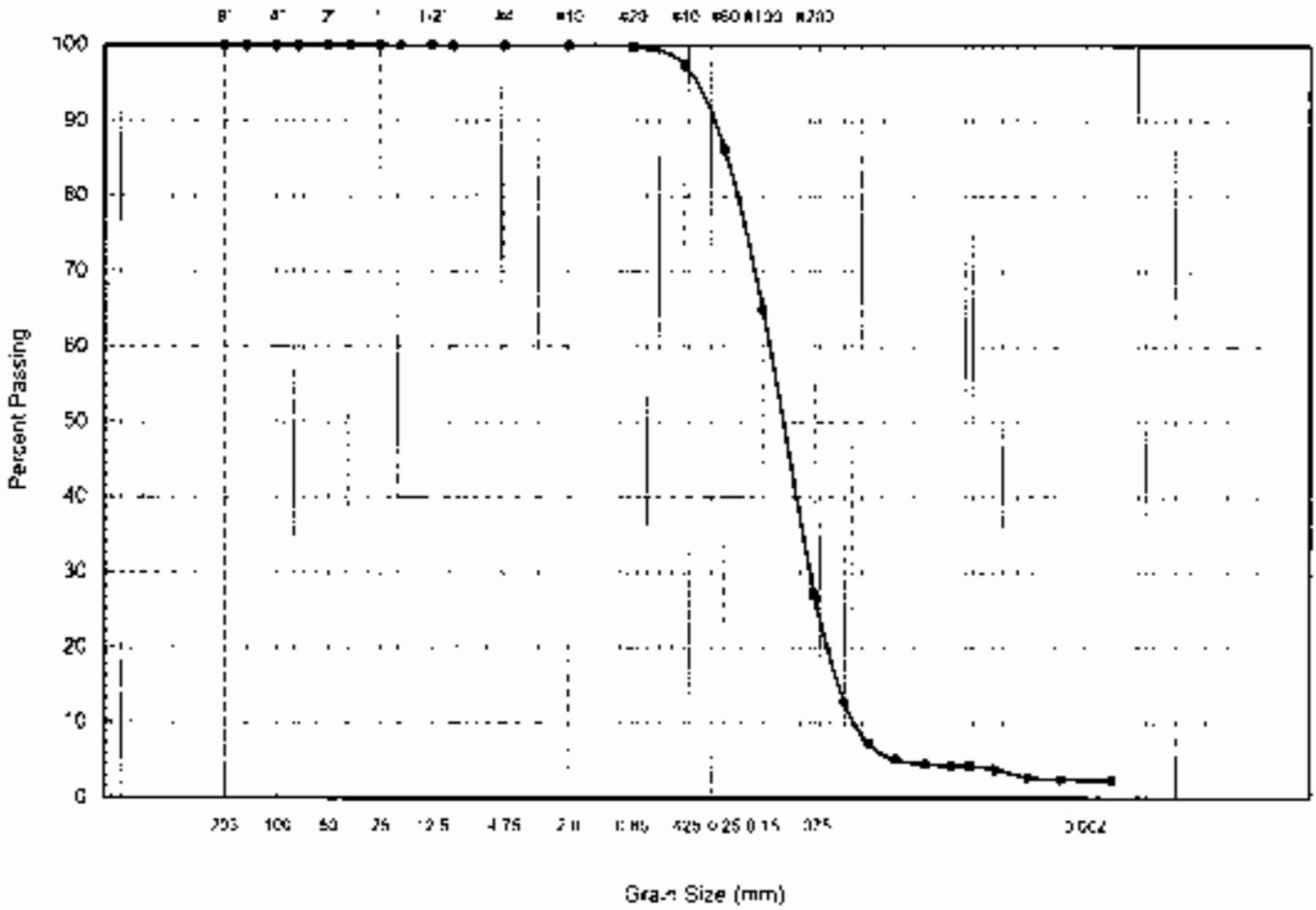
AMEC Earth & Environmental

Per: _____

HYDROMETER TEST

AMEC Earth & Environmental

COBBLES	GRAVEL		SAND SIZES			SILT	CLAY
	Coarse	Fine	C	M	F		



Remarks:

Atterberg Limits = non-plastic.

Summary					
D10 =	0.0431	mm	**Gravel**	0	%
D30 =	0.0807	mm	**Sand**	73	%
D60 =	0.1402	mm	**Silt**	25	%
Cu =	3.25		**Clay**	2	%
Cc =	1.08				

Project No: VM00351
Hole No: MPV-04-204
Depth (m): 4.3-4.4

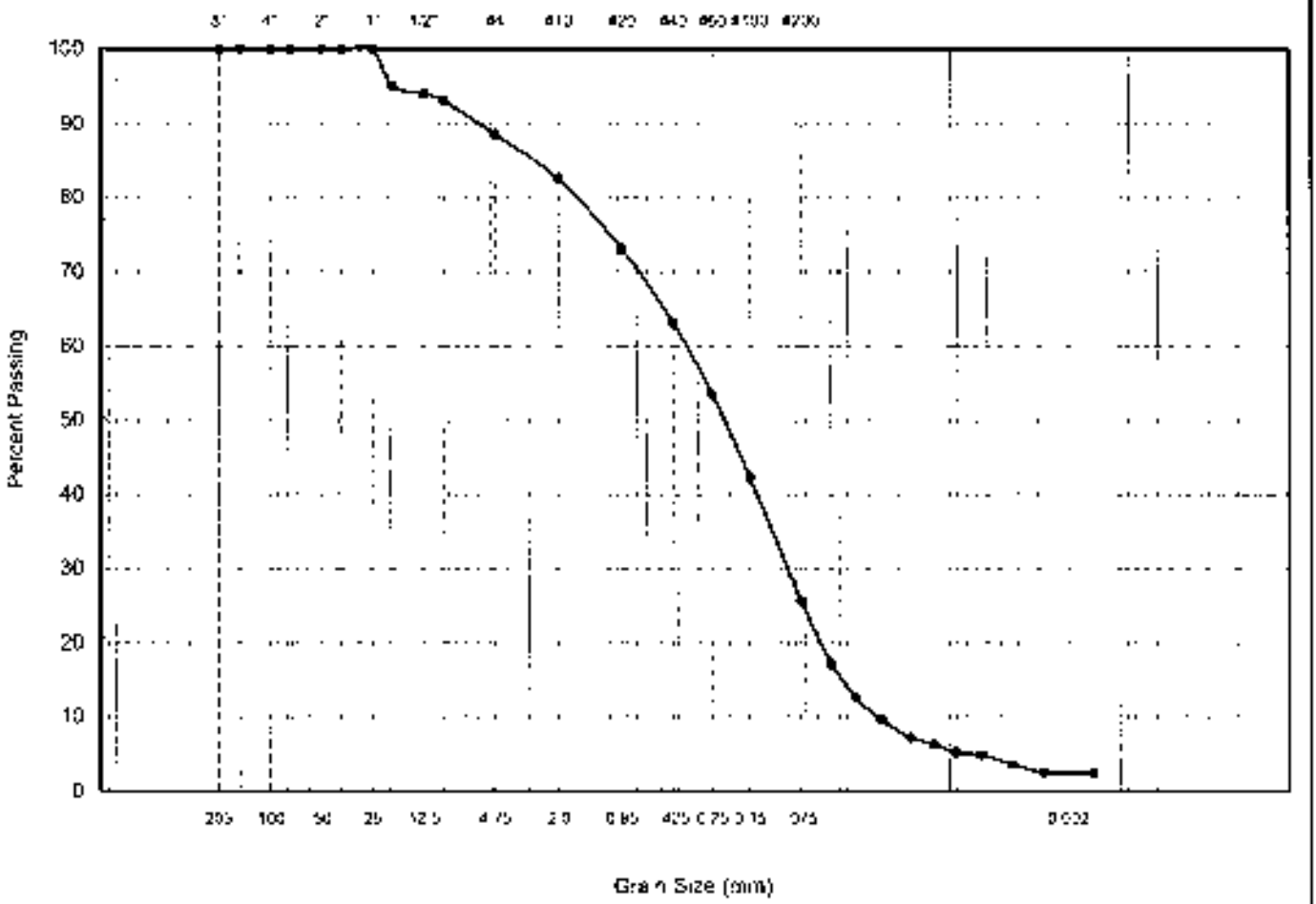
Location: Gahcho Kue Diamond Project
Sample: SA 5
Technician: LR

Date: 16-Jul-04

HYDROMETER TEST

AMEC Earth & Environmental

COBBLES	GRAVEL		SAND SIZES			SILT	CLAY
	Coarse	Fine	C	M	F		



Remarks:

Atterberg Limits = non-plastic

Summary					
D10 =	0.0267	mm	Gravel	12	%
D30 =	0.0948	mm	Sand	63	%
D60 =	0.3689	mm	Silt	22	%
Cu =	13.81		Clay	3	%
Cc =	0.91				

Project No: VM00351
Hole No: MPV-04-205
Depth (m): 0.85-0.90

Location: Gahcho Kue Diamond Project
Sample: SA 1
Technician: LR

Date: 16-Jul-04

SIEVE ANALYSIS REPORT

AMEC Earth & Environmental

To: AMEC E & C Services Ltd.
400 111 Dunsmuir Street
Vancouver, B.C. V6B 5W3

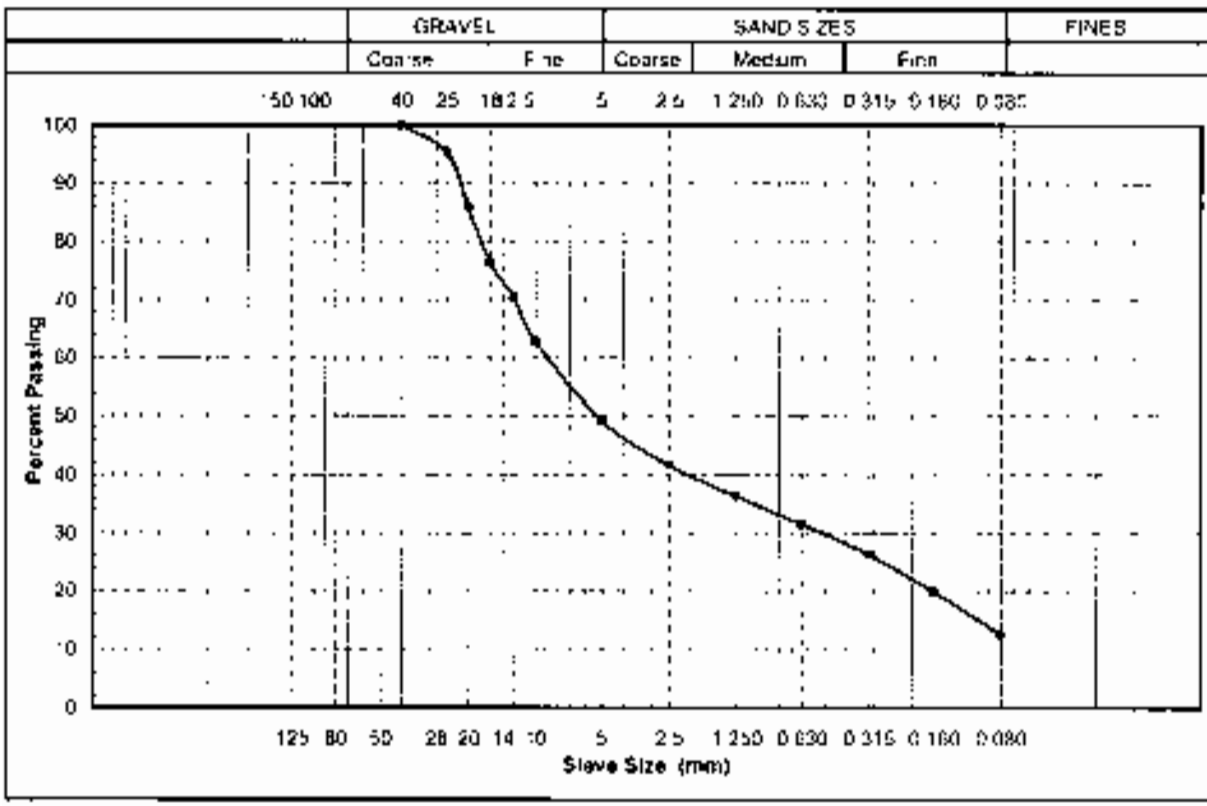
Office : Calgary
Project No: VM00351
Client : AMEC E & C Services Ltd.
Copies to :

Attn: Todd Martin

Project: Gahcho Kue Diamond Project

Sample ID: MPV-04-205, SA 2 **Sample Type:** **Sampled By:** AMEC

Date Sampled: 01-May-04 **Date Received:** **Date Tested:** 08-Jul-04



Sieve Size	% Passing
150.0	
125.0	
100.0	
80.0	
50.0	
40.0	100
28.0	
25.0	95
20.0	80
16.0	76
14.0	
12.5	70
10.0	63
5.0	49
2.5	42
1.250	36
0.630	31
0.315	26
0.160	20
0.080	12.6
C_u	
C_c	

Source: MPV-04-205, Sample 2
Sample Description: 2.25 m - 2.30 m
Comments : No specs.

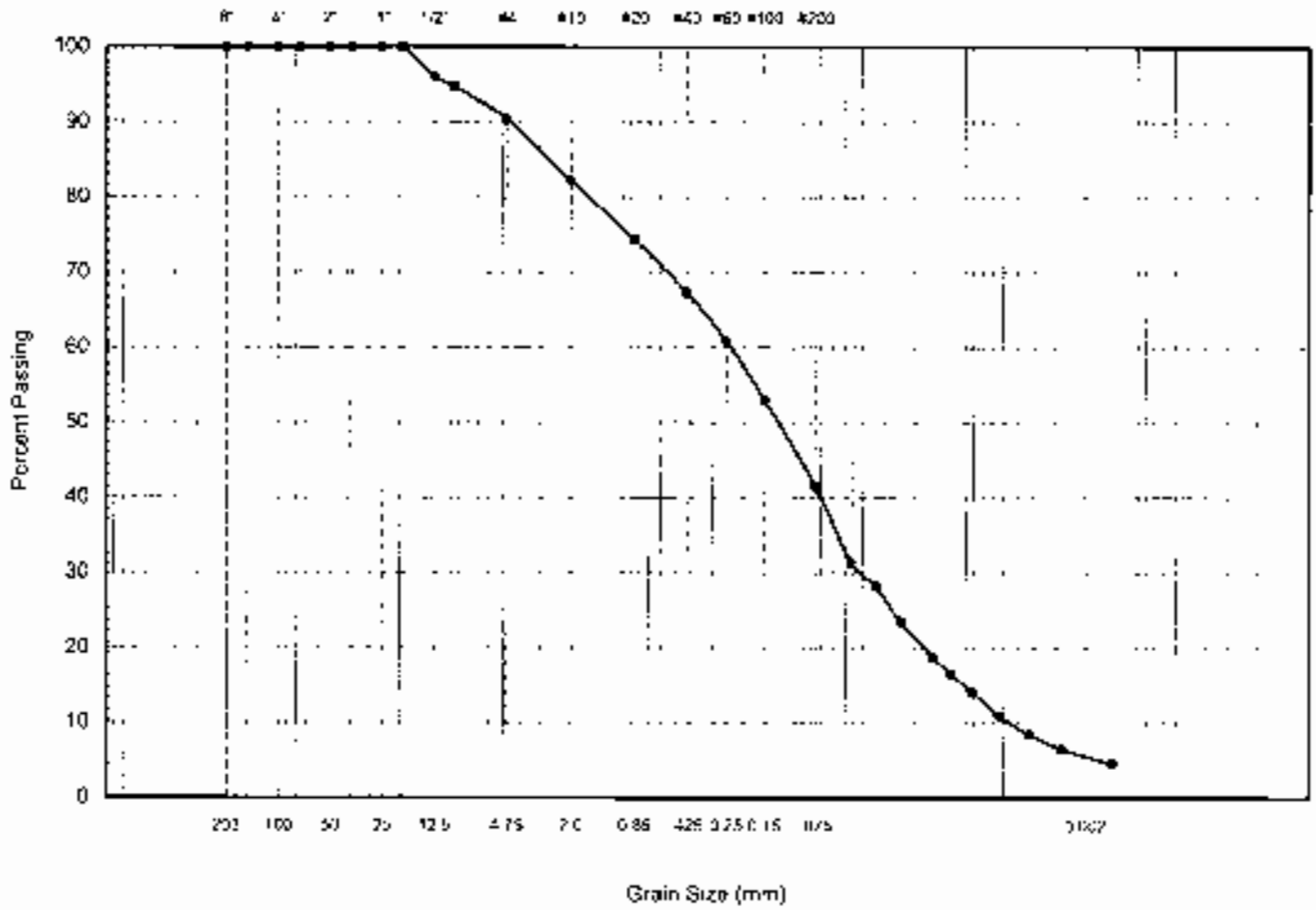
AMEC Earth & Environmental

Per: _____

HYDROMETER TEST

AMEC Earth & Environmental

COBBLES	GRAVEL		SAND SIZES			SILT	CLAY
	Coarse	Fine	C	M	F		



Remarks:

Atterberg Limits = non-plastic.

Summary					
D10 =	0.0055	mm	**Gravel**	10	%
D30 =	0.0411	mm	**Sand**	49	%
D60 =	0.2395	mm	**Silt**	36	%
Cu =	43.23		**Clay**	5	%
Cc =	1.27				

Project No: VM00351
Hole No: MPV-04-206
Depth (m): 2.05-2.1

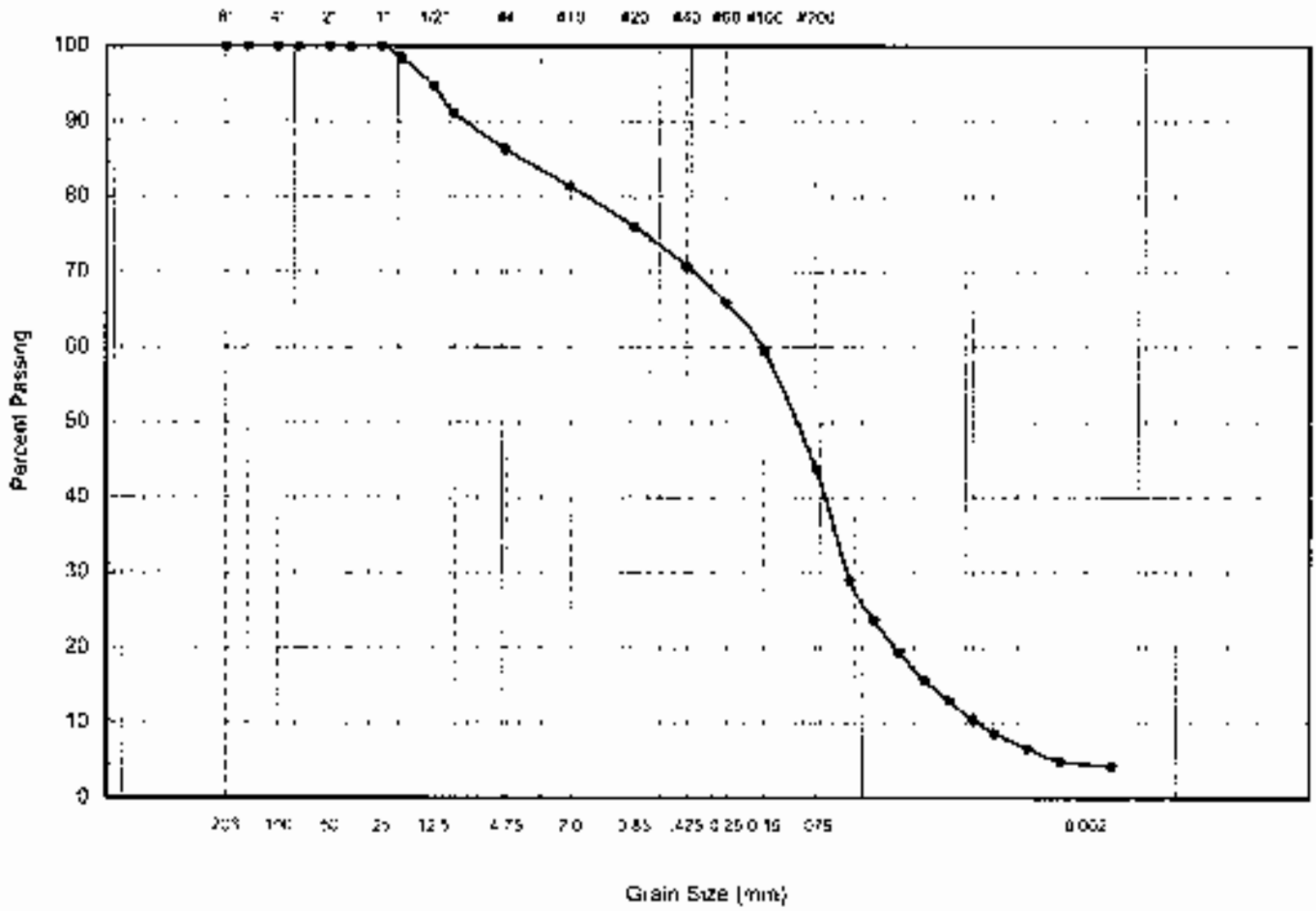
Location: Gahcho Kue Diamond Project
Sample: SA 3
Technician: LR

Date: 16-Jul-04

HYDROMETER TEST

AMEC Earth & Environmental

COBBLES	GRAVEL		SAND SIZES			SILT	CLAY
	Coarse	Fine	C	M	F		



Remarks:

Atterberg Limits = non-plastic

Summary					
D10 =	0.0085	mm	**Gravel**	14	%
D30 =	0.0494	mm	**Sand**	43	%
D60 =	0.1580	mm	**Silt**	39	%
Cu =	18.48		**Clay**	4	%
Cc =	1.81				

Project No: VM00351
Hole No: MPV-04-206
Depth (m): 2.65-2.75

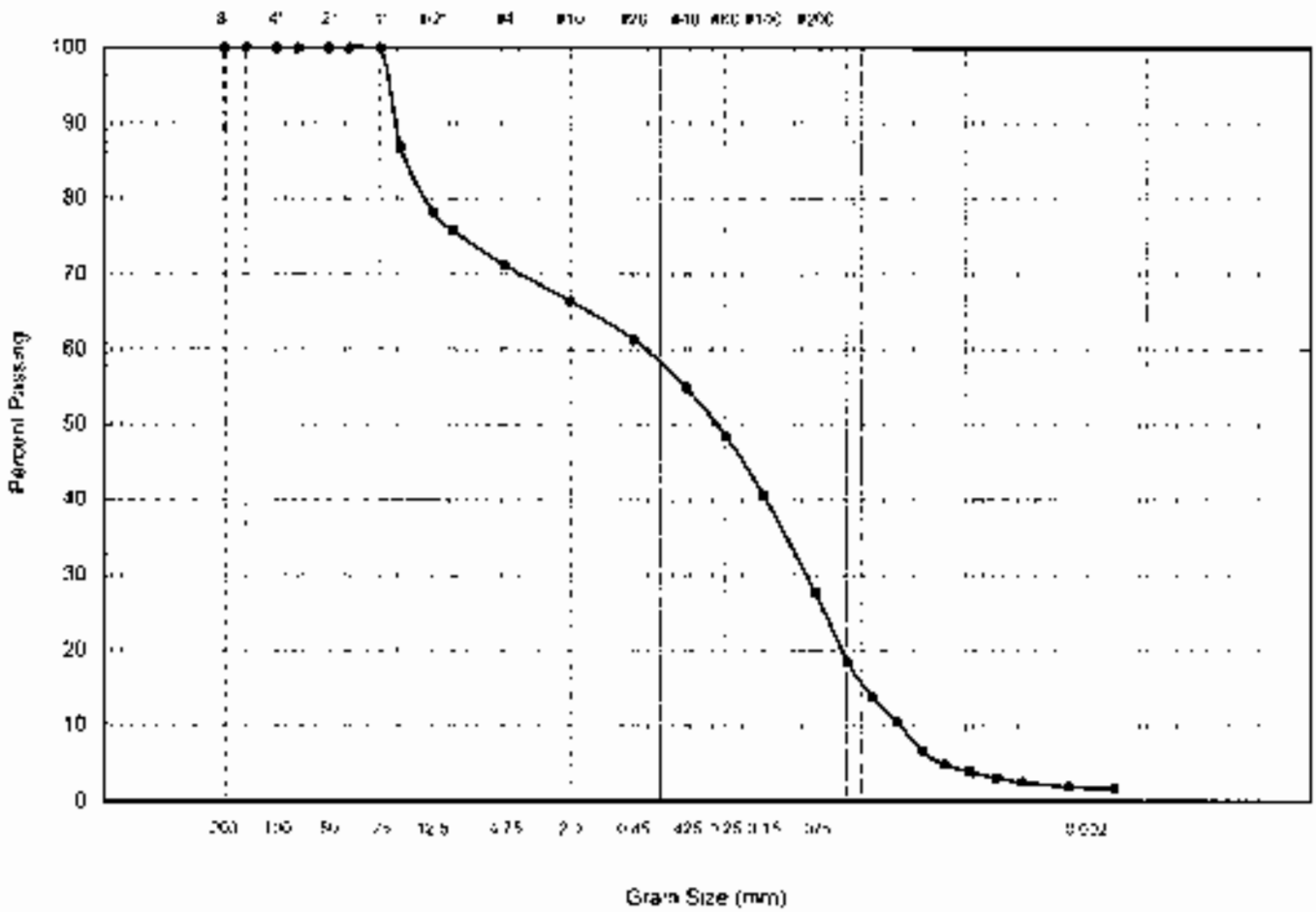
Location: Gahcho Kue Diamond Project
Sample: SA 4
Technician: LR

Date: 16-Jul-04

HYDROMETER TEST

AMEC Earth & Environmental

COBBLES	GRAVEL		SAND SIZES			SILT	CLAY
	Coarse	Fine	C	M	F		



Remarks:

Atterberg Limits = non-plastic.

Summary					
D10 =	0.0240	mm	**Gravel**	29	%
D30 =	0.0886	mm	**Sand**	43	%
D60 =	0.7646	mm	**Silt**	26	%
Cu =	31.91		**Clay**	2	%
Cc =	0.43				

Project No: VM00351
Hole No: MPV-04-206
Depth (m): 3.15-3.25

Location: Gahcho Kue Diamond Project
Sample: SA 5
Technician: LR

Date: 16-Jul-04

SIEVE ANALYSIS REPORT

AMEC Earth & Environmental

amec

To: AMEC E & C Services Ltd.
400 111 Dunsmuir Street
Vancouver, B.C. V6B 5W3

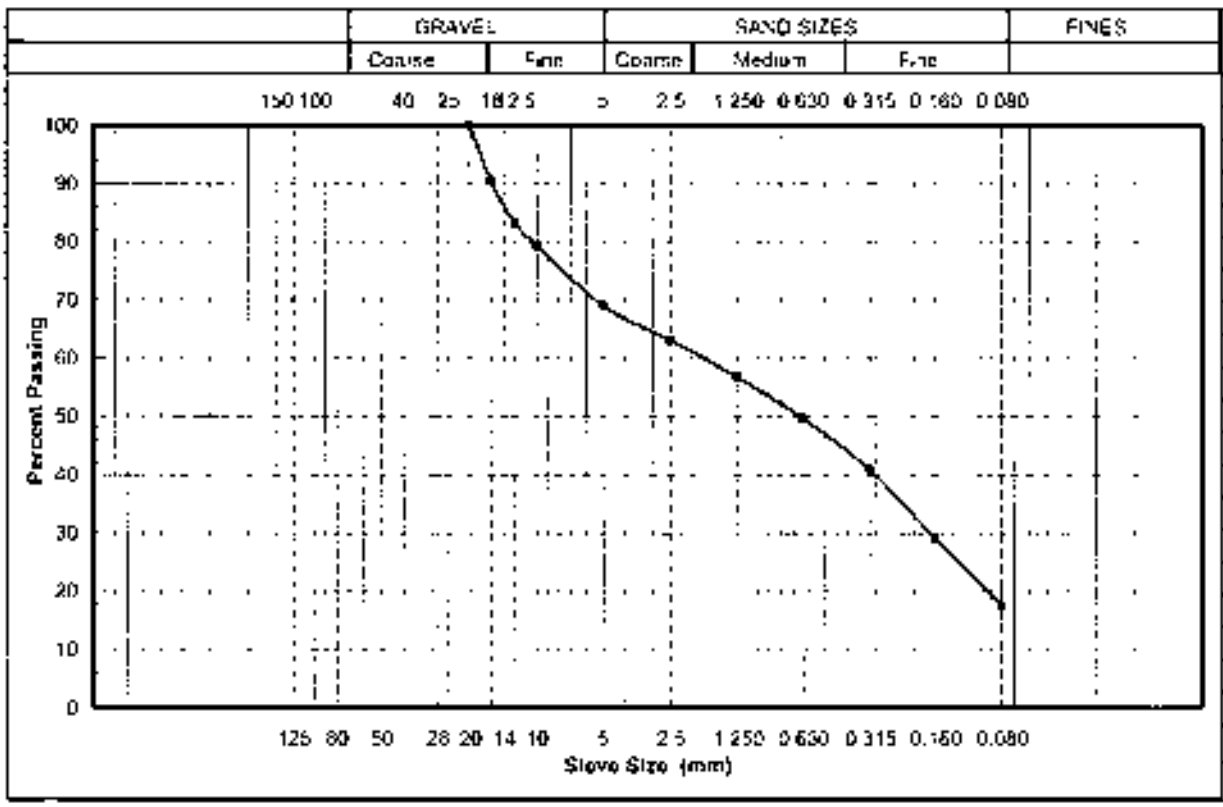
Office : Calgary
Project No: VM00351
Client : AMEC E & C Services Ltd.
Copies to :

Attn: Todd Martin

Project: Gahcho Kue Diamond Project

Sample ID: MPV-04-206, SA 6 **Sample Type:** **Sampled By:** AMEC

Date Sampled: 03-May-04 **Date Received:** **Date Tested:** 08-Jul-04



Sieve Size	% Passing
150.0	
125.0	
100.0	
80.0	
50.0	
40.0	
28.0	
25.0	
20.0	100
16.0	91
14.0	
12.5	83
10.0	79
5.0	69
2.5	63
1.250	57
0.630	50
0.315	41
0.160	29
0.080	17.4
C_u	
C_c	

Source: MPV-04-206, Sample 6
Sample Description: 5.3 m - 5.4 m
Comments : No specs.

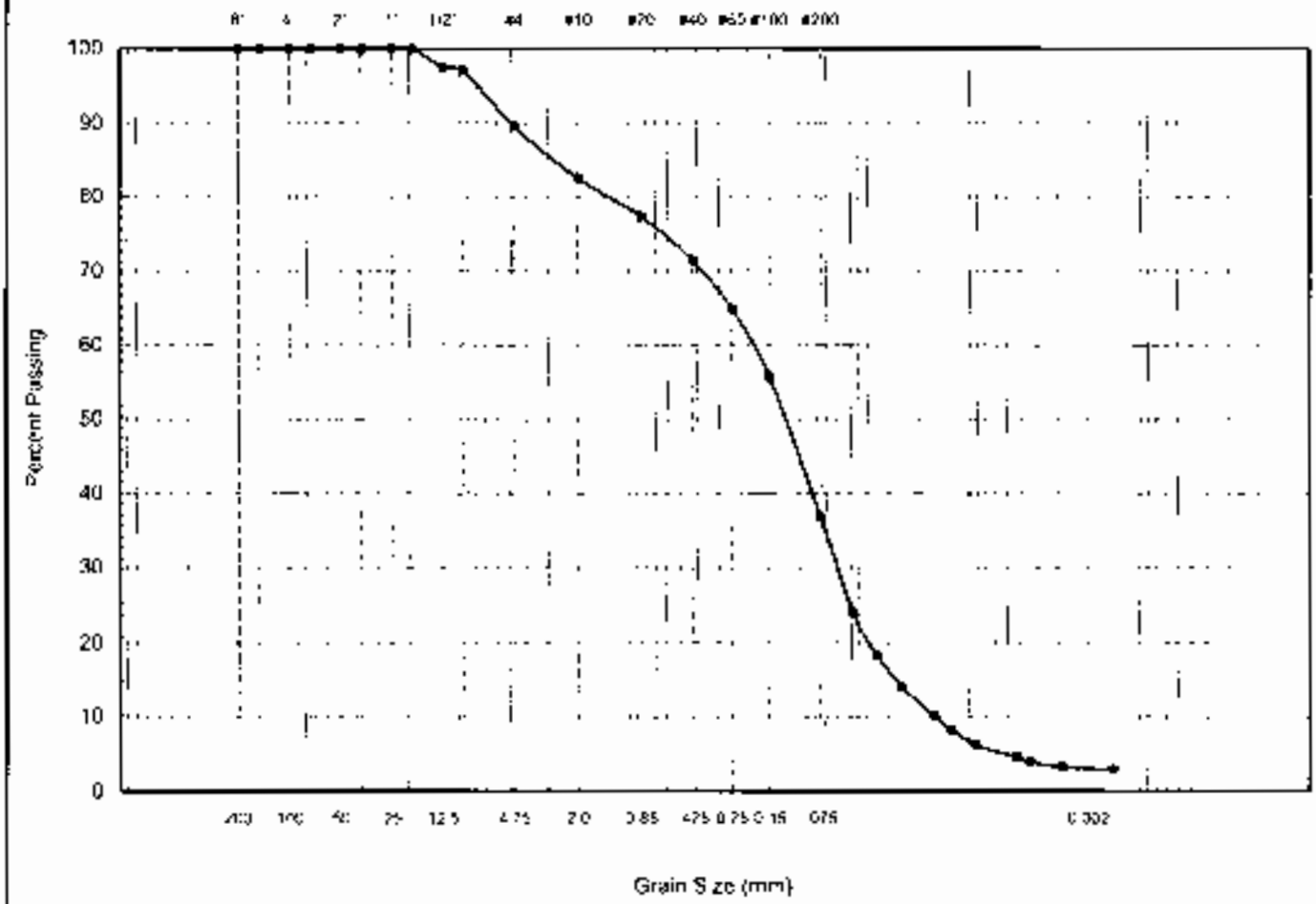
AMEC Earth & Environmental

Per: _____

HYDROMETER TEST

AMEC Earth & Environmental

COBBLES	GRAVEL		SAND SIZES			SILT	CLAY
	Coarse	Fine	C	M	F		



Remarks:

Atterberg Limits – non-plastic.

Summary					
D10 =	0.0159	mm	**Gravel**	11	%
D30 =	0.0609	mm	**Sand**	53	%
D60 =	0.1974	mm	**Silt**	33	%
Cu =	12.39		**Clay**	3	%
Cc =	1.18				

Project No:	VM00351	**Location:**	Gahcho Kue Diamond Project		
Hole No:	MPV-04-207	**Sample:**	SA3		
Depth (m):	3.56-3.66	**Technician:**	LR	**Date:**	16-Jul-04

HYDROMETER TEST

Project	Gaucho Kue		
Lab Order	VM00351 Task E4		
Sample			
Location			
Hole	Loon Ooze	Depth	Bucket #1 & #2
Technician	LK	Date	20-Apr-04

Hydrometer No. 799 Hydrometer Type 151 Graduate No. 1

Air Dried Wt. of Soil Tested 35.89 g Dry Wt. of Soil Tested 35.89

Moisture Content

Tare 1. g Wet + Tare Dry + Tare M.C. 0.00%

Composite Correction Factors

0 intercept 8.70 Slope -0.174 Specific Gravity G_s 2.09

Dispersant

Type 10 % Sodium Hexametaphosphate Amount 125 Date Mixed & Jug No.

Mechanical Sieve Results

Total Wt of Sample Dry g

\+ # 10 g

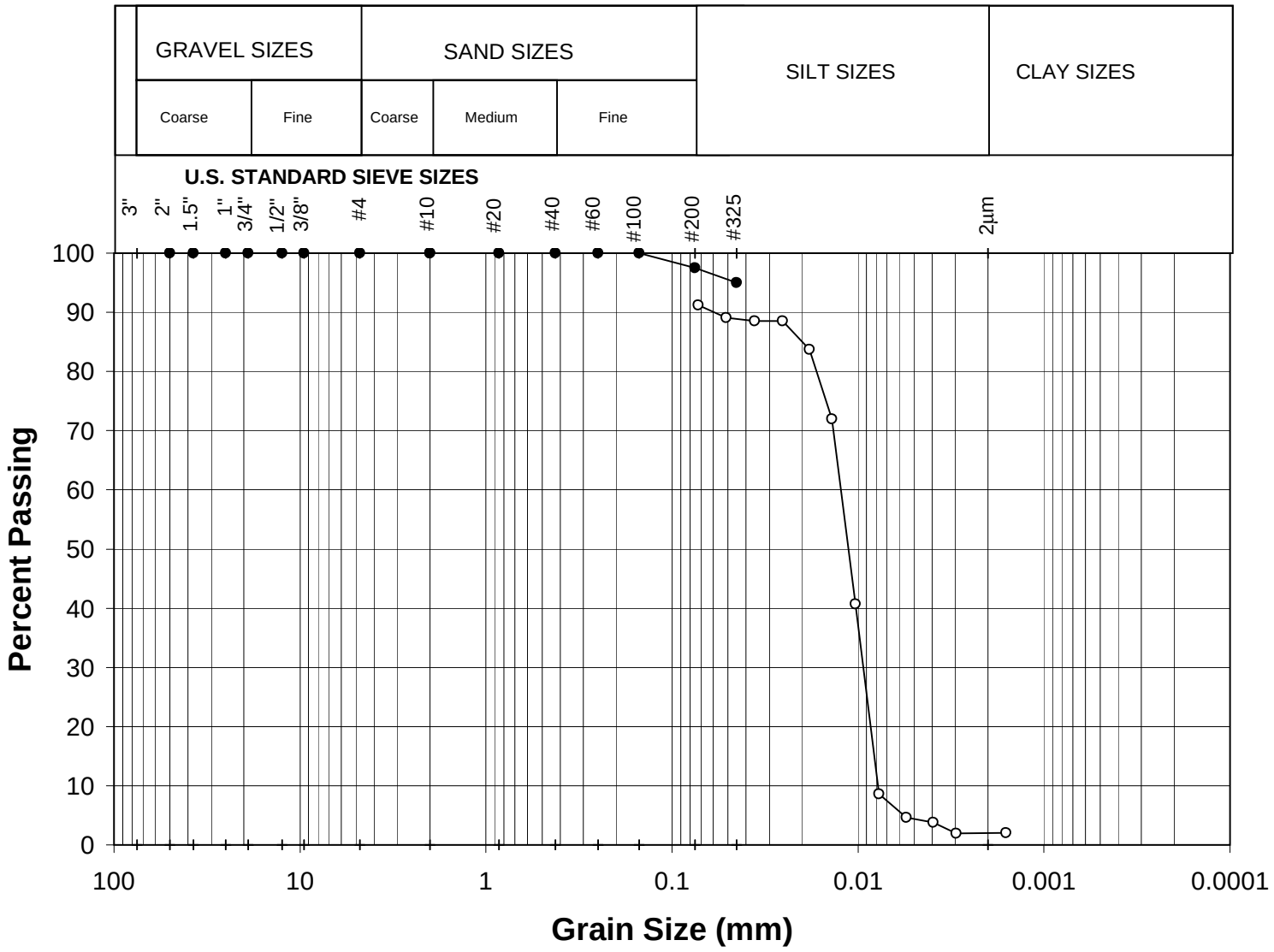
\- # 10 g

Hydrometer Test
(Adjusted for + # 10 Material)
Total Dry Wt. 35.89 g

Sieve Size	Particle Size (mm)	Weight Retained (g)	Weight Passing (g)	Percent Finer Than	Sieve #	Particle Size (mm)	Weight Retained (g)	Weight Passing (g)	Percent Finer Than
2 in.	50.0		0.00	100.0	10	2.000		35.89	100
1 1/2 in.	37.5		0.00	100.0	20	0.850		35.89	100
1 in.	25.0		0.00	100.0	40	0.425		35.89	100
3/4 in.	19.0		0.00	100.0	60	0.250		35.89	100
1/2 in.	12.5		0.00	100.0	100	0.150		35.89	100
3/8 in.	9.5		0.00	100.0	200	0.075	0.912	34.98	97
4	4.75		0.00	100.0	325	0.045	0.883	34.10	95
10	2.00		0.00	100.0	pan				

Hydrometer Results

Date	Time	Elapsed Time (min)	R'_h	Temp. °C	Effective Length (cm)	Comp. Corr.	Corrected Reading	Diam. (mm)	% Soil in Susp.
04/20/2004	8:42:00	0							
04/20/2004	8:42:30	0.5	22.5	18.8	10.5	5.42202	17.07798	0.0721	91
04/20/2004	8:43:00	1	22.1	18.8	10.5	5.42202	16.67798	0.0510	89
04/20/2004	8:44:00	2	22	18.8	10.5	5.42202	16.57798	0.0360	89
04/20/2004	8:46:00	4	22	18.8	10.5	5.42202	16.57798	0.0255	89
04/20/2004	8:50:00	8	21.1	18.8	10.7	5.42202	15.67798	0.0182	84
04/20/2004	8:57:00	15	18.9	18.8	11.5	5.42202	13.47798	0.0138	72
04/20/2004	9:12:00	30	13	19	12.9	5.3872	7.6128	0.0103	41
04/20/2004	9:42:00	60	7	19	14.4	5.3872	1.6128	0.0077	9
04/20/2004	10:42:00	120	6.2	19.3	14.7	5.33497	0.86503	0.0055	5
04/20/2004	12:42:00	240	5.9	20.1	15	5.19569	0.70431	0.0039	4
04/20/2004	16:42:00	420	5.5	20.4	15	5.14346	0.35654	0.0030	2
04/21/2004	8:14:00	1412	6	17.7	14.7	5.61353	0.38647	0.0016	2



Remarks	SUMMARY			
	D_{10} =	0.008	Gravel	0.0 %
	D_{30} =	0.009	Sand	2.5 %
	D_{50} =	0.011	Silt Sizes	95.4 %
	D_{60} =	0.012	Clay Sizes	2.0 %
	C_U =	#N/A		
	C_C =	#N/A		

Results of Other Testing

WL	%
WP	%
IP	%

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Grain Size Distribution

Project	Gaucho Kue		
Lab Order	VM00351 Task E4		
Sample	0		
Location	Less consistent - Upper Sediments		
Hole	Loon Ooze	Depth	Bucket #1 & #2
Technician	LK	Date	20-Apr-04

SETTLING TEST

Project:	De Beers Canada - Gaucho Kue		
Project No:	VM00351 Task 4	**Lab No:**	S-8590
Sample:	Upper Lake Sediments (Ooze)	**Location:**	Bucket #1 & #2
Date:	20-Apr-04	**Technologist:**	LK

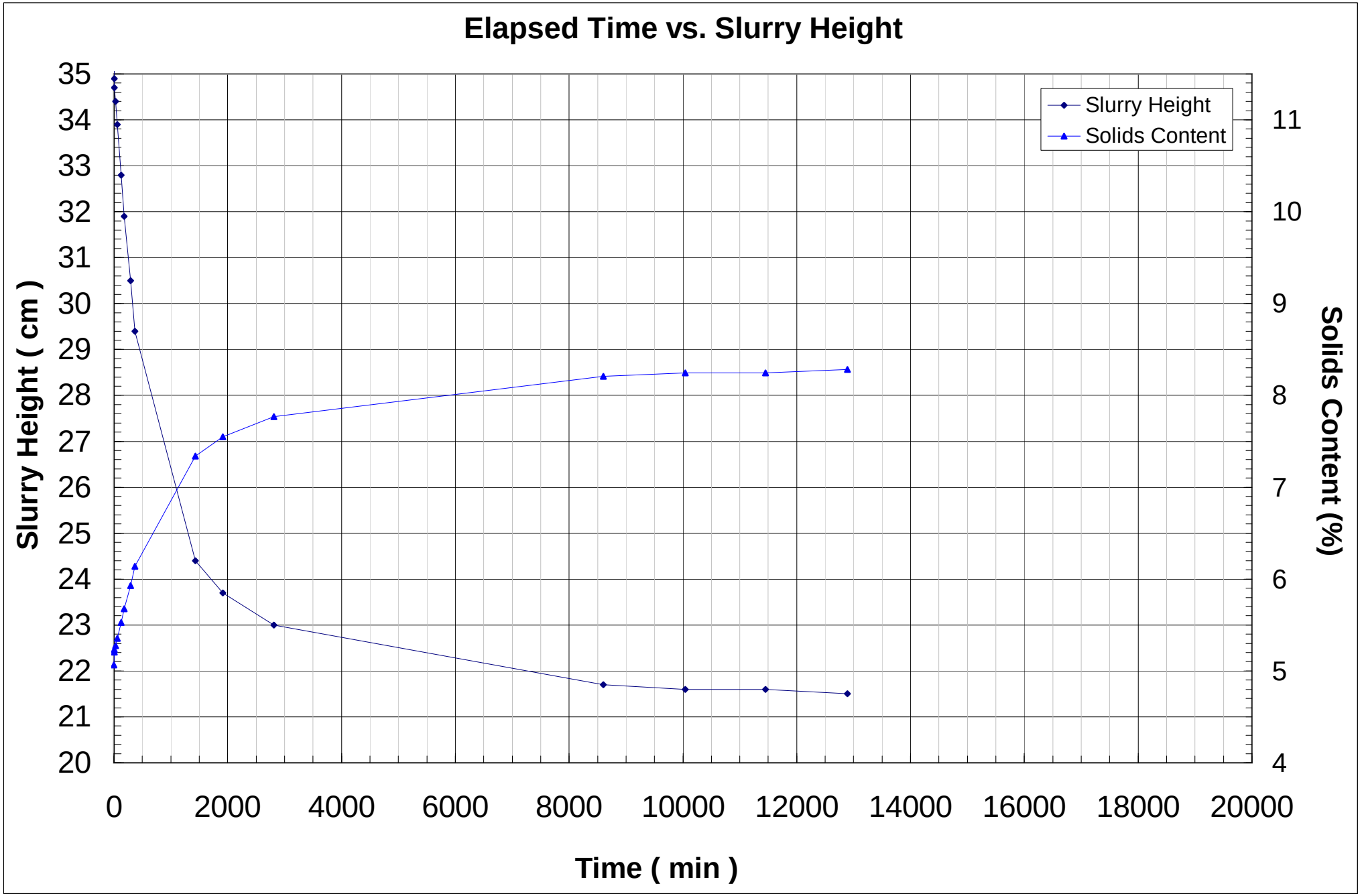
TEST DATA

Date	Time	Elapsed Time (hrs)	Elapsed Time (min)	Temperature (^{0}C)	Reading	Slurry Height (cm)	Solids Content (%)	Photo No.	Comments
20-Apr-04	9:34	0	0	18.9	180.5	35.9	5.1		Lake water
	9:39	0.083	5	18.9	181.5	34.9	5.2	107-0716, 0717	
	9:44	0.167	10	18.9	181.7	34.7	5.2	107-0718	
	10:04	0.5	30	19	182.0	34.4	5.3		
	10:34	1	60	21.6	182.5	33.9	5.4	107-0726	
	11:45	2.18	131	21.6	183.6	32.8	5.5	107-0728	
	12:34	3.0	180	21.8	184.5	31.9	5.7	107-0704	
	14:25	4.85	291	22	185.9	30.5	5.9	107-0708	
	15:45	6.18	371	21.1	187.0	29.4	6.1		
21-Apr-04	8:15	23.85	1431	22.1	192.0	24.4	7.3	107-0711	
	16:20	31.93	1916	21.2	192.7	23.7	7.5		
22-Apr-04	8:25	46.85	2811	21.3	193.4	23.0	7.8	107-0719	
26-Apr-04	8:55	143.35	8601	21.5	194.7	21.7	8.2	107-0721	
27-Apr-04	8:55	167.35	10041	21.5	194.8	21.6	8.2		
28-Apr-04	8:25	190.85	11451	21.2	194.8	21.6	8.2		
29-Apr-04	8:30	214.85	12891	21.1	194.9	21.5	8.3	107-0741	

Volume of Slurry (ml)	1000
Weight of Slurry (g)	1026.8
Weight of Dry Solids (g)	51.34
Initial Solids Content (%)	5.0

NOTE: Water above the settled material remained murky for the entire test

Gaucho Kue
Project No. VM00351 Task E4
Sediment From Bucket 1 and 2



Gaucho Kue
Lake Sediment From Buckets 1 and 2

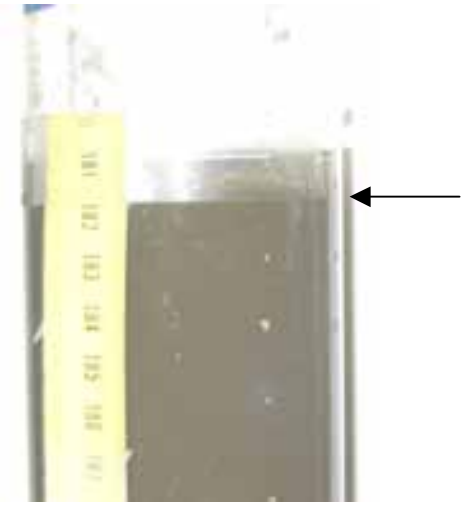


Photo No. 107-0716
Elapsed Time- 5 min

Photo No. 107-0718
Elapsed Time- 10 min

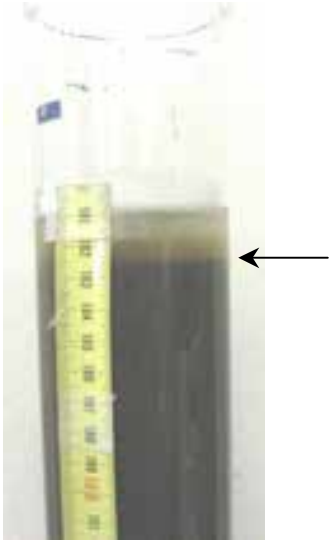


Photo No. 107-0726
Elapsed Time- 60 min

Photo No. 107-0728
Elapsed Time- 131 min

Photo No. 107-0704
Elapsed Time- 180 min

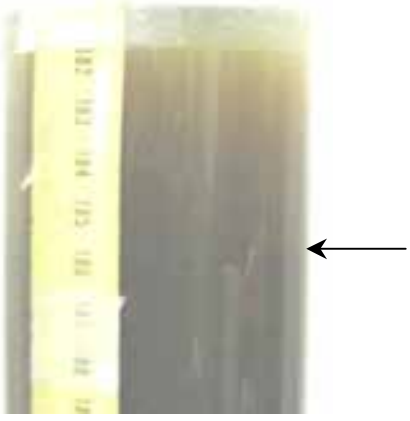


Photo No. 107-0708
Elapsed Time- 291 min

Gaucho Kue
Lake Sediment From Buckets 1 and 2

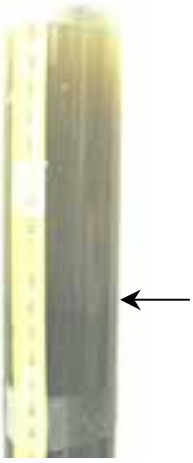


Photo No. 107-0711
Elapsed Time- 1431 min

Photo No. 107-0719
Elapsed Time- 2811 min (46.9hrs)

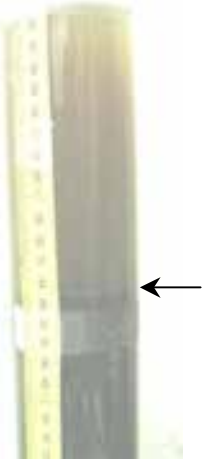


Photo No. 107-0721
Elapsed Time- 8601 min (143.4hrs)

Photo No. 107-0741
Elapsed Time- 12891 min (214.9 hrs)

HYDROMETER TEST

Project	Gaucho Kue		
Lab Order	VM00351 Task E4		
Sample			
Location			
Hole	Loon Ooze	Depth	Bucket #3
Technician	LK	Date	20-Apr-04

Hydrometer No. 799 Hydrometer Type 151 Graduate No. 1

Air Dried Wt. of Soil Tested 38.5 g Dry Wt. of Soil Tested 38.50

Moisture Content

Tare 1. g Wet + Tare Dry + Tare M.C. 0.00%

Composite Correction Factors

0 intercept 8.70 Slope -0.174 Specific Gravity G_s 2.09

Dispersant

Type 10 % Sodium Hexametaphosphate Amount 125 Date Mixed & Jug No.

Mechanical Sieve Results

Total Wt of Sample Dry g

\+ # 10 g

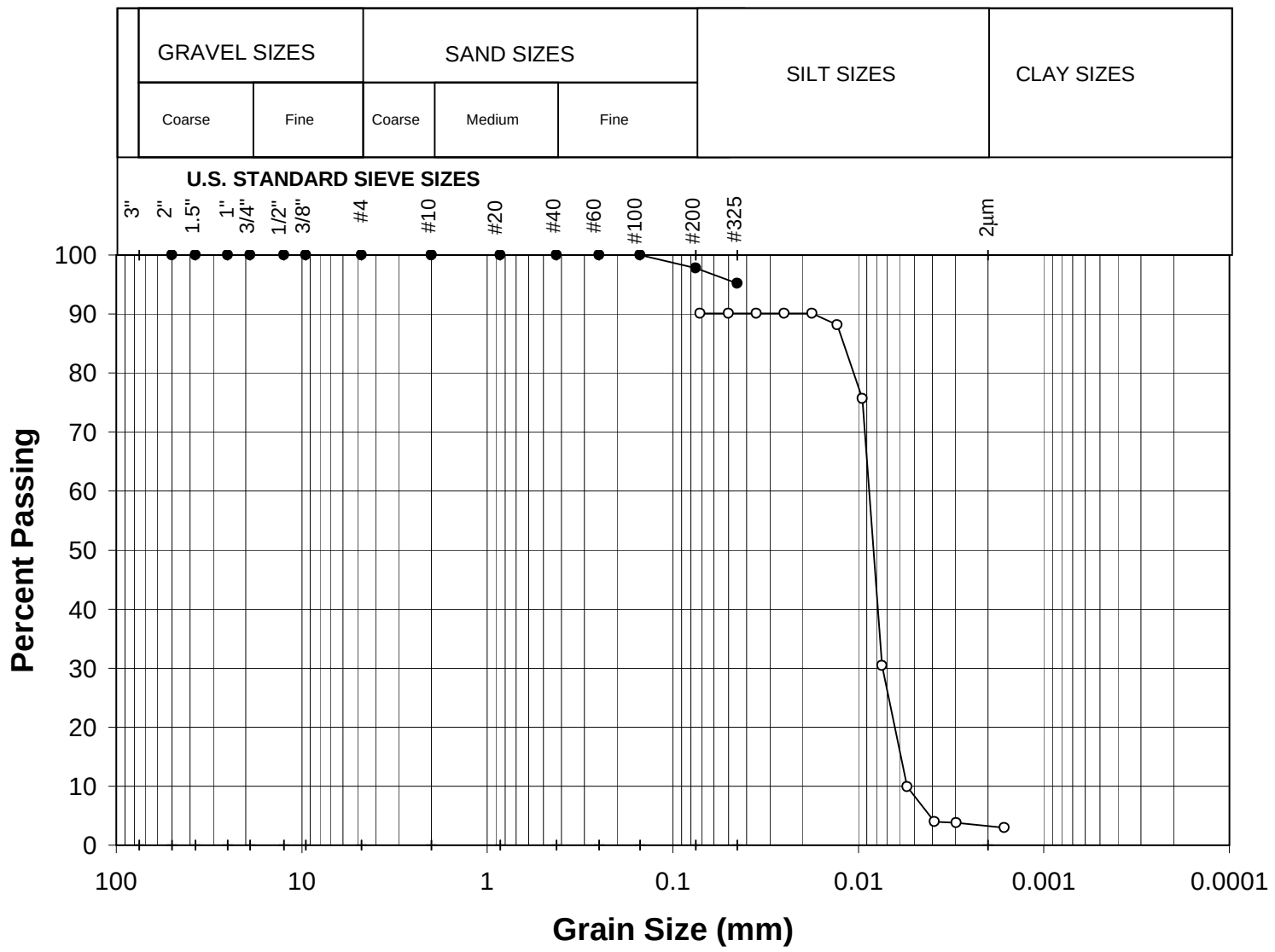
\- # 10 g

Hydrometer Test
(Adjusted for + # 10 Material)
Total Dry Wt. 38.50 g

Sieve Size	Particle Size (mm)	Weight Retained (g)	Weight Passing (g)	Percent Finer Than	Sieve #	Particle Size (mm)	Weight Retained (g)	Weight Passing (g)	Percent Finer Than
2 in.	50.0		0.00	100.0	10	2.000		38.50	100
1 1/2 in.	37.5		0.00	100.0	20	0.850		38.50	100
1 in.	25.0		0.00	100.0	40	0.425		38.50	100
3/4 in.	19.0		0.00	100.0	60	0.250		38.50	100
1/2 in.	12.5		0.00	100.0	100	0.150		38.50	100
3/8 in.	9.5		0.00	100.0	200	0.075	0.844	37.66	98
4	4.75		0.00	100.0	325	0.045	1.002	36.65	95
10	2.00		0.00	100.0	pan				

Hydrometer Results

Date	Time	Elapsed Time (min)	R'_h	Temp. °C	Effective Length (cm)	Comp. Corr.	Corrected Reading	Diam. (mm)	% Soil in Susp.
04/20/2004	8:42:00	0							
04/20/2004	8:42:30	0.5	23.5	18.9	10.2	5.40461	18.09539	0.0710	90
04/20/2004	8:43:00	1	23.5	18.9	10.2	5.40461	18.09539	0.0502	90
04/20/2004	8:44:00	2	23.5	18.9	10.2	5.40461	18.09539	0.0355	90
04/20/2004	8:46:00	4	23.5	18.9	10.2	5.40461	18.09539	0.0251	90
04/20/2004	8:50:00	8	23.5	18.9	10.2	5.40461	18.09539	0.0178	90
04/20/2004	8:57:00	15	23.1	18.9	10.2	5.40461	17.69539	0.0130	88
04/20/2004	9:12:00	30	20.6	18.9	11	5.40461	15.19539	0.0095	76
04/20/2004	9:42:00	60	11.5	19	13.4	5.3872	6.1128	0.0074	30
04/20/2004	10:42:00	120	7.3	19.4	14.4	5.31756	1.98244	0.0054	10
04/20/2004	12:42:00	240	6	20.1	14.7	5.19569	0.80431	0.0039	4
04/20/2004	16:42:00	420	5.9	20.4	15	5.14346	0.75654	0.0030	4
04/21/2004	7:22:00	1360	6.2	17.7	14.7	5.61353	0.58647	0.0016	3



Remarks	SUMMARY			
	D_{10} =	0.005	Gravel	0.0 %
	D_{30} =	0.007	Sand	2.2 %
	D_{50} =	0.008	Silt Sizes	94.7 %
	D_{60} =	0.009	Clay Sizes	3.2 %
	C_U =	#N/A		
	C_C =	#N/A		

Results of Other Testing

WL	%
WP	%
IP	%

amec

Grain Size Distribution

Project	Gaucho Kue		
Lab Order	VM00351 Task E4		
Sample	0		
Location	more consistant material - Lake Bottom Sediments		
Hole	Loon Ooze	Depth	Bucket #3
Technician	LK	Date	20-Apr-04

SETTLING TEST

Project:	De Beers Canada - Gaucho Kue		
Project No:	VM00351 Task 4	**Lab No:**	S-8590
Sample:	Lower Lake Bottom Sediments	**Location:**	Bucket #3
Date:	20-Apr-04	**Technologist:**	LK

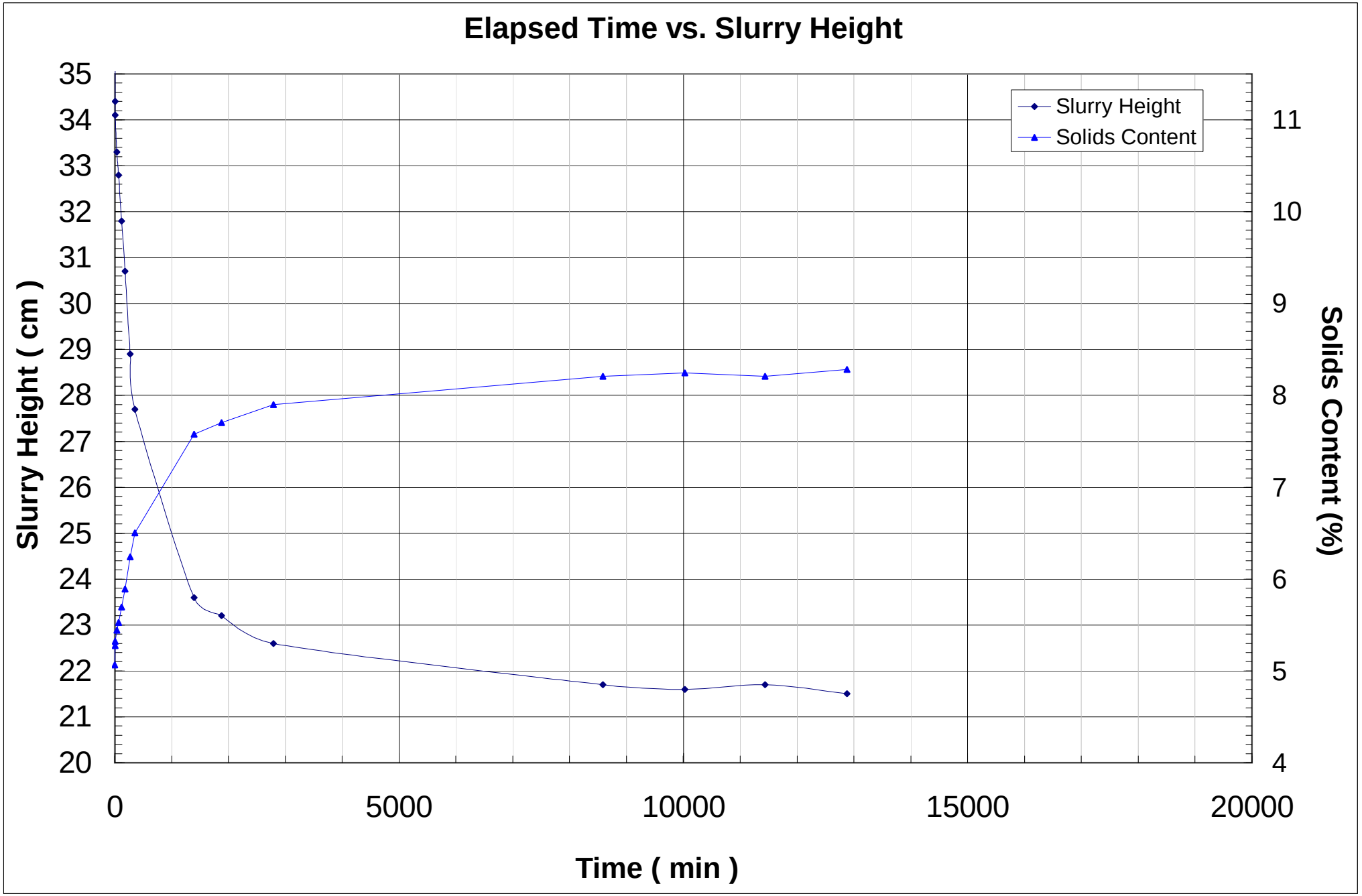
TEST DATA

Date	Time	Elapsed Time (hrs)	Elapsed Time (min)	Temperature (^{0}C)	Reading	Slurry Height (cm)	Solids Content (%)	Photo No.	Comments
20-Apr-04	9:50	0	0	18.9	50.0	35.9	5.1		Lake water
	9:55	0.083	5	19	51.5	34.4	5.3	107-0721	
	10:00	0.167	10	19	51.8	34.1	5.3	107-0722	
	10:30	0.67	40	19	52.6	33.3	5.4	107-0724	
	11:00	1.17	70	19.4	53.1	32.8	5.5	107-0727	
	11:50	2	120	19.7	54.1	31.8	5.7	107-0729	
	12:50	3.0	180	20.1	55.2	30.7	5.9	107-0705	
	14:25	4.58	275	20.7	57.0	28.9	6.2	107-0709	
	15:45	5.92	355	21.5	58.2	27.7	6.5		
21-Apr-04	8:15	23.25	1395	17.7	62.3	23.6	7.6	107-0710	
	16:20	31.33	1880	21.8	62.7	23.2	7.7		
22-Apr-04	8:25	46.58	2795	18.5	63.3	22.6	7.9	107-0720	
26-Apr-04	8:55	143.1	8586	21.5	64.2	21.7	8.2	107-0722	
27-Apr-04	8:55	167.1	10026	21.5	64.3	21.6	8.2		
28-Apr-04	8:25	190.6	11436	21.2	64.2	21.7	8.2		
29-Apr-04	8:30	214.6	12876	21.1	64.4	21.5	8.3	107-0742	

Volume of Slurry (ml)	1000
Weight of Slurry (g)	1027.2
Weight of Dry Solids (g)	51.36
Initial Solids Content (%)	5.0

NOTE: Water above the settled material remained murky for the entire test

Gaucho Kue
VM00351 Task E4
Lake Sediment Bucket #3



Gaucho Kue
VM00351 Task E4
Lake Sediment Bucket #3

Photo No. 107-0721
Elapsed Time- 5 min

Photo No. 107-0722
Elapsed Time- 10 min

Photo No. 107-0724
Elapsed Time- 30 min

107-0727
Elapsed Time- 60 min

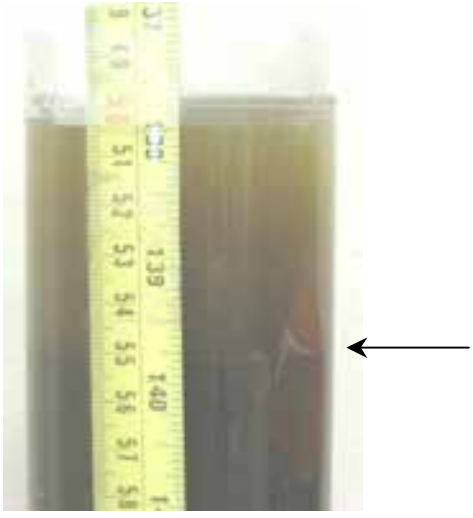


Photo No. 107-0705
Elapsed Time- 180 min

Photo No. 107-0709
Elapsed Time- 275 min

Gaucho Kue
VM00351 Task E4
Lake Sediment Bucket #3

Photo No. 107-0710
Elapsed Time- 1395 min (23.3 hrs)

Photo No. 107-0720
Elapsed Time- 2795 min (46.6hrs)

Photo No. 107-0722
Elapsed Time- 8586 min (143.1hrs)

Photo No. 107-0742
Elapsed Time- 12876 min (241.6 hrs)